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The ATARI® Resource

FEBRUARY 1986 VOLUME 4, NUMBER 10

PRINTER POWER

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- Customized T-shirts
- Build a 2-printer cable
- 5 reviews of new printers

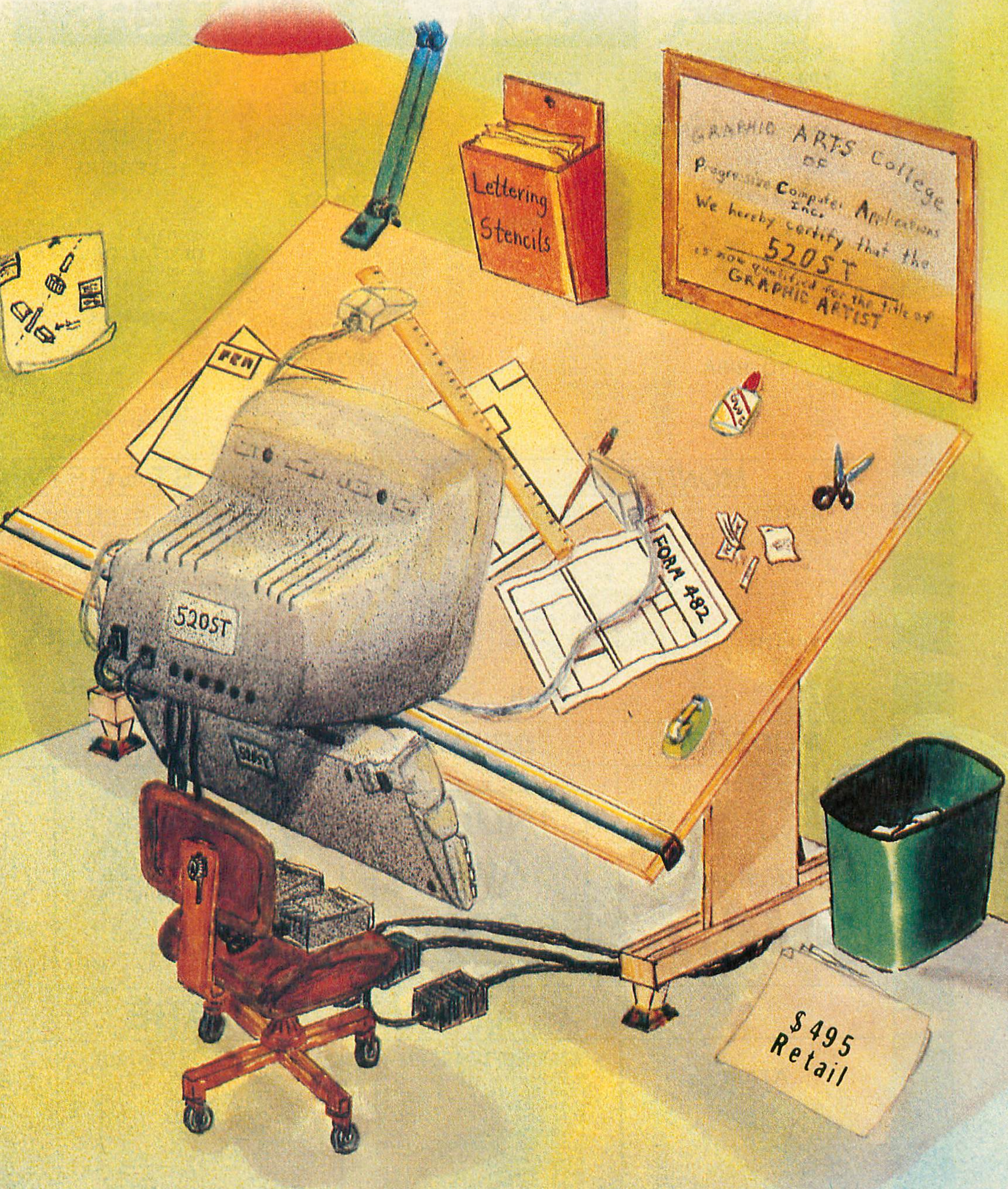
$2,000 ST Graphics Contest

Inside: 10 Type-In Programs

PCA, Inc.

Teach Your 520ST A Powerful New Trade:

Graphic Arts



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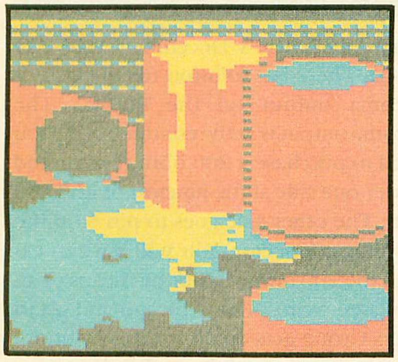
The ATARI® Resource FEBRUARY 1986, VOLUME 4, NUMBER 10



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ST SECTION

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i/o board

PRODUCTIVITY, PLEASE

As the microcomputer age matures (and as young microcomputer enthusiasts mature), Ataris are being used more often to increase personal productivity. Yet Antic, a great magazine overall, is very sparse in coverage of personal productivity software. This is critical for users like me who live in other countries and depend on advertising and magazine reviews to guide our mail order purchasing decisions. We'd be grateful if you would produce more reviews of word processors, spreadsheets and the like.

Kirk Darling
Philippine Islands

*Until recently, there was not very much serious Atari applications software to review. Fortunately that is now changing. You'll find a wealth of ways to put your Atari to work next month (March, 1985), in **Antic's** Personal Productivity issue.*—ANTIC ED

CROSSED STARS

In the review of the Star SG-10 printer in the July, 1985 **Antic**, Charles Jackson says that the SG-10 works with Print Shop software. I tried, and it didn't work. The people at Broderbund advised me that Print Shop is not compatible with either the SG-10 or the SD-10.

Kenneth M. Cox
Fayetteville, AR

*Star Micronics told **Antic** that the printers ARE compatible—just configure Print Shop for a Gemini 10X and make sure your printer is in STAR mode (DIP switch 2-2 is UP). **Antic** successfully used Print Shop with many Star Micronics printers to test the Graphic Shop program.*
—ANTIC ED

AUTOBOOT

How can I implement AUTORUN.SYS so that a BASIC program will run automatically when I boot the disk?

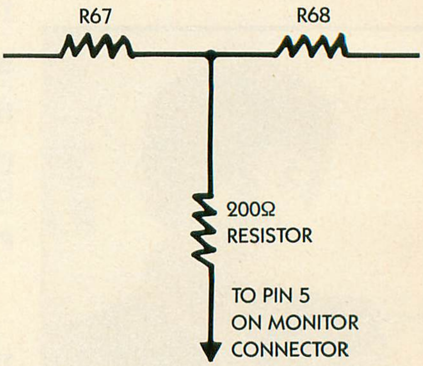
Greg Pearson
Windsor, CO

*You'll find everything you need to know about AUTORUN.SYS in the Lazy Loader sidebar on page 35 of the May, 1985 **Antic***—ANTIC ED

MORE CHROMA

Regarding **Antic's** December, 1985 I/O board: There is a solution for the lack of chroma output on the 800XL. The chroma output is at the emitter of Q5. You need to purchase a 200 ohm resistor and solder one side at the juncton of R67 and R68. The other side goes to pin 5 on the monitor connector. You will have to extend the 200 ohm resistor by means of an insulated wire. The Chicagoland Atari Users Group gets credit for this solution.

Johnny Borden
Oak Lawn, IL



LUCKY STRIKE

This is for Chris Puzzelle, the unlucky guy who wrote to I/O (December, 1985) that he can't find a replacement for his 800 that got struck by lightning. Computer Mail Order (see their advertisement in **Antic**) is selling Atari 800 computers for a mere $69.95. But I strongly suggest that you buy a 130XE instead. With that 128K of RAM and SpartaDOS by ICD, you can configure 64K of extra memory as a 507-sector RAMdisk. You can also configure a second 59-sector RAMdisk to operate under Atari BASIC. I have found RAMdisks invaluable when developing assembly language programs where I may work with as many as six different .INCLUDE files at once. Also, the 130XE keyboard rivals that of the old 800.

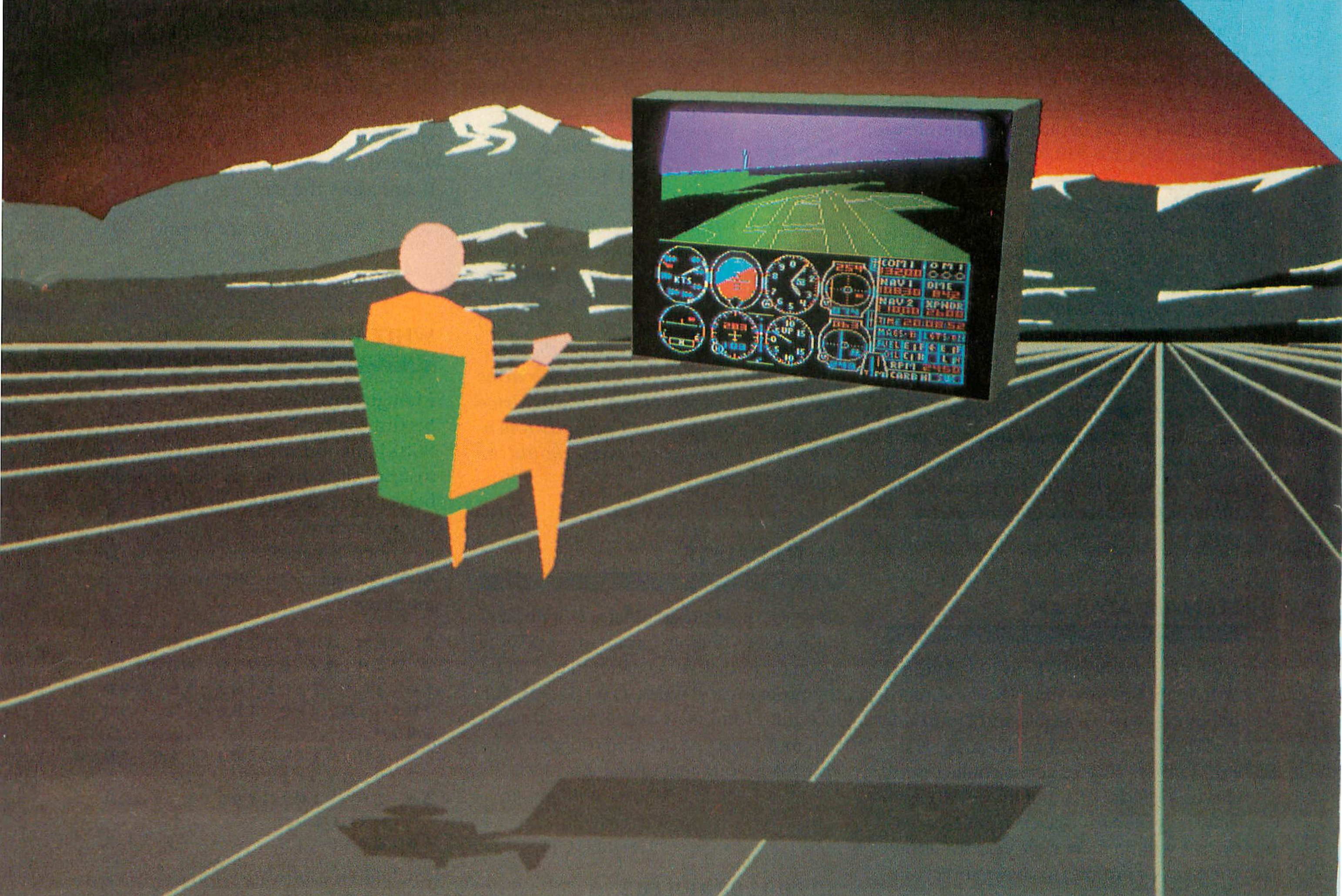
Matthew Ratcliff
Ferguson, MO

*Matthew Ratcliff is the author of **Antic's** Revision C Converter and Atari 'Toons. Several other readers also suggested retailers who offer the Atari 800.*
—ANTIC ED

continued on page 8

Flight Simulator II

For Atari computers with 48K memory



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continued from page 6

MOONLIGHT RIGHTS

The Antic Catalog is a great way to get otherwise impossible-to-find software, but now I'm worried about changes. Before the catalog, Graphic Shop would have been listed as part of the magazine instead of being sold for $19.95 in the catalog.

Ray Hill

Before the Antic Catalog, an independent Atari programmer did not have an outlet to sell utility software that was too complex for publication as a magazine listing. Graphic Shop was co-written by staff programmer Charles Jackson (on his own time) and freelancer Darryl May. Jackson should have the same right as any other programmer to moonlight and earn extra money. During the Atari market's leanest times, the Antic Catalog saved an entire body of fine third-party software from becoming unavailable. —ANTIC ED

GERMAN ATARIAN

In 1983 I bought a 600XL. In 1984 I visited the U.S. and first saw Antic. I became a subscriber as soon as possible and I must tell you I didn't regret it. Your magazine is superb. I would love to get in contact with Atari users in the USA, but how? I'm especially interested in contacts from New Jersey, as I will be there next year for about four weeks. I promise to answer every single letter I get.

Michael Schutz
Fritz-Kalle-Str. 26
6200 Wiesbaden
West Germany

POLAND PLEA

I am the owner of the modern computer, Atari 600XL. But I have great difficulty finding books or magazines about Atari computers in Poland. Thank you in advance for any help your readers can give me.

Bogdan Borowczyk
66-400 Gorzow Wlkp
UL. Ios. Gdynskich
8117 Poland

OUT OF REACH

Is it true that you must put your disk drive at least three feet away from your TV set? What if you have a monitor? I've seen it closer in photographs—right next to the computer. It would be a lot easier to use if it wasn't so far away!

Andrew Diller
Chevy Chase, MD

Television sets and monitors put out static magnetic discharge—some more than others. This could possibly cause disk data loss. But personally, we've never run into the problem. However, if you pressed a disk right up against the monitor, you could lose data. Give your arms a break and try moving your disk drive closer. As long as it's not actually touching the TV set, your data should be fine.—ANTIC ED

AUTO DELETE

Here is a short program I use to automatically delete lines in programs. LIST the program to disk or cassette, then ENTER the program and type GOTO 32700. Follow the prompts to delete lines. Be sure to remove this line deletion routine before you SAVE your main program.

Tlanzo Williams Jr.
Warrensville
Heights, OH

```
32700 GRAPHICS 0:? :? "
STARTING LINE NUMBER";:
INPUT START:? :? "ENDIN
G LINE NUMBER";:INPUT F
INISH
32710 ? :? "INCREMENT";
:INPUT INC:FOR X=START
TO FINISH STEP INC
32720 ? CHR$(125):? :?
:? X:? :? :? "CONT"
32730 POSITION 2,0:POKE
 842,13:STOP
32740 POKE 842,12:NEXT
X
```

DRAPER PASCAL

*Draper Software, of 307 Forest Grove, Richardson, TX 75080, would like **Antic** readers to know that Draper Pascal is still on the market.*—ANTIC ED

STRIPE STRIPPER

I noted with interest Bob Whipple's letter in the October, 1985 **Antic** with a fix for Print Shop's striped printouts on his BMC BX-80 printer. Print Shop software was also causing this problem on my CP-80 printer. I tried the Mannesmann Talley Spirit 80 setup as he suggested and it worked for me too. Once again, **Antic** I/O Board saves the day.

Bruce Young
Ryukyu ACE
Okinawa, Japan

WHIZ KID

I bought my son David an Atari 400 for his fifth birthday and this year got him an 800XL (he just turned six). Every night, instead of wanting to read children's books, he reads **Antic**, which he begs me to buy each month. He even got mad at me once because I didn't know what RAMtop meant. He also wrote this simple program:

```
8 REM JOYSTICK TEST
9 REM BY DAVID NOOR
10 IF STICK(0)=15 AND S
TRIG(0)<>0 THEN ? "NOTH
ING"
20 IF STICK(0)<>15 THEN
 ? "JOYSTICK"
30 IF STRIG(0)=0 THEN ?
 "TRIGGER"
40 GOTO 10
```

Children's software is too easy for him, but everything else is too difficult. And now my son is begging me to learn machine language, which I know nothing about! I don't know where to turn, as I don't think there are any resources to teach machine language to a child.

His Mother,
Jackie Noor
Corvalis, OR

Luckily, Oregon has some very progressive computer education programs. You might try contacting Margaret Moore, an Assistant Professor in the Department of Math Education at Oregon State University in Corvalis, or Jack Turner, Computer Coordinator at the Eugene School District, for advice.—ANTIC ED

help!

MYSTERY PRODUCT

Reading **Antic's** June, 1985 article about Atari MIDI connections reminded me of an amazing product I saw last year at a computer show in San Francisco.

Unfortunately I don't remember the name, but the product included a keyboard, a light pen, microphone, interface box and software. You would hear a sound through the microphone (like a musical instrument or spoken voice) and a wave pattern would show up on the screen. When you traced over the screen pattern with the light pen, the keyboard would be programmed with that sound. At the time, the vendor said it was not available on the Atari because they could not get enough data from Atari Corp.

Is this product available on the Atari yet? And if it is, will it work with the Casio CZ-101 synthesizer? Do you think that by using a microphone through your home stereo, with the line fed into the Atari DIN jack, a software program for the Atari light pen and the MidiTrack II could do the same things?

Mark Hannan
Antioch, CA

*Sorry, **Antic** would need at least the name of this product before we could try to find an answer for you. Maybe another reader has this information.*
—ANTIC ED

ST HELP

Okay, we make mistakes in the ST Section too. In the December, 1985 review of 4xFORTH we compared our October, 1985 Sieve of Eratosthenes test of 3.8 seconds for Digital Research C with a one-pass time of 1.1 seconds for 4xFORTH. Unfortunately, the C benchmark was for 10 passes, so the equivalent 4xFORTH time is actually 11 seconds. That's still very good.

68000 SUM

Also in the December, 1985 issue, Introducing 520ST Assembly Language states, "the sum of the first N even natural numbers—or 2+4+ . . . +N." This should be 2+4+ . . . +2N.

LOGO TYPO

Finally, there is a typo on page 61 of ST Logo Exploration (December, 1985). The example, **TYPE :HCR** should read, **TYPE :HCHR.** and line 2 of that example should read, **MAKE "HCHR PIECE :A+ :A+1 :A+ :A+2 :HEX1.**

We'd like to thank eagle-eyed Bill Wilkinson of Optimized Systems Software for spotting every single one of the above errors.

MORE FORTH

Mike Starling, from the Dragon Group also spotted the 4xFORTH error. (Probably because he wrote the language.) With the Level 2 Accelerator, Mike tells us, 4xFORTH can accomplish 10 passes in high level execution in 3.8 seconds.

There have also been a number of updates to 4xFORTH that resolve most problems mentioned in our review. If you own the package, please remember to send your registration card to 4xFORTH. As Mike says, "It's tough to provide good support if we don't have your address."

NEW TOS

Of course it had to happen. **Antic** had no sooner published a "definitive" outline of TOS (January, 1986) when we received a new TOS version from Atari. It's a bit smaller (198,126 bytes), but otherwise seems pretty much the same as the previous TOS.

Well, almost . . . You may recall we wrote last month about Desk Accessories needing the filename, DESK1.ACC. It now seems that desk accesories may have any filename as long as the extender is .ACC.

One other obvious change: The thermonuclear bombs generated by a system crash now are round, black anarchist bombs with fuses.

editorial

TOP 10 PRINTERS FOR ATARI

ANTIC ONLINE users poll results

Which printers are most widely used by Atari owners? How good do Atari owners think their printers are? **Antic** now has much fuller answers to these questions—after analyzing the 1,034 responses in our biggest-ever CompuServe ANTIC ONLINE poll. As a result, we plan to publish even more programs compatible with the top-rated printers. And here are the highlights of what we learned:

Nearly 120 different printer models were named in the survey. However, the bulk of these printers only got a handful of votes—often merely one or two responses apiece. In contrast, the Top Ten printers accounted for 68.7 percent of the total vote.

MOST WIDELY OWNED:

1.	Gemini 10X	11.9%
2.	Star SG-10	8.6%
3.	ProWriter	7.1%
4.	Epson RX-80	7.0%
5.	Epson FX-80	6.5%
6.	Epson MX-80	6.2%
7.	Panasonic KX	5.9%
8.	*Two-Way Tie*	
	Okimate 10	5.8%
	Atari 1027	5.8%
9.	Atari 1025	4.1%

Star Micronics provided the two most widely owned printers, the no-longer-made Gemini 10X and its worthy successor, the new Star SG-10. **Antic** has consistently recommended these full-featured dot-matrix printers as best buys. In particular, the near letter-quality mode of the $299 SG-10 (**Antic**, July 1985) rivals many daisy-wheel printers.

A number of the most widely sold printers during the past few years have now been replaced by newer models. The poll reflected this, with several recently discontinued units scoring high on the popularity list.

Eight of the Top Ten printers were versatile dot-matrix units, moderately priced in the $250-$550 range. Rounding out Top Ten were an inexpensive letter-quality printer, the Atari 1027 ($199), and a low-cost color printer, the Okimate 10 ($235).

In third place was the durable C. Itoh ProWriter ($549 for latest SEP+ version, reviewed in this issue). If the survey's C. Itoh votes which *didn't* specify any model were added, the ProWriter would have risen to second place.

Epson was clearly the most popular manufacturer of Atari-compatible printers, with three models in the Top Ten. The inexpensive RX-80 ($299) ranked higher than the costlier but more feature-laden Epson FX-80 and MX-80.

Overall, Atari users seem to be very satisfied with their printers. Even most of the less-widely-used printers tended to be highly rated by their owners.

HIGHEST QUALITY

		Rating
1.	SG-10	4.5
2.	Epson RX-80	4.3
3.	*Four-Way Tie:*	
	Gemini 10X	4.2
	ProWriter	4.2
	Epson FX-80	4.2
	Panasonic KX	4.2
4.	Epson MX-80	4
5.	Okimate 10	3.6
6.	Atari 1025	3
7.	Atari 1027	2.6

In this survey, ANTIC ONLINE readers were asked to name the printer they owned, and then to rate it in six categories—text quality, speed, graphics quality (if applicable), ease of use, reliability and value for price.

The 10 most popular printers are ranked here by their average rate in all six categories of quality. The ratings were made on a scale of 1 to 5, with 5 the highest. **Antic** Program Editor Charles Jackson wrote a program that automatically tallied the scores.

Only at the lower end of the Top Ten do we find average ratings of less

than 4. The Okimate 10 is primarily a color graphics printer and was rated only 3 for both text and speed. The old Atari 1027 and 1025 printers were designed to sell for very low prices in their day, so naturally they run slower and offer less features than costlier printers.

This survey was done online in order to take advantage of the speed of interactive telecommunications and collect a substantial number of responses as quickly as possible. Therefore, the poll only reflects Atari users who own modems, subscribe to Compuserve, and log onto ANTIC ONLINE and SIG*Atari.

However, these telecommunicators are among the most committed and well-informed members of the Atari community. They know what they're talking about when it comes to computer products—and they don't mince words when they judge something to be substandard. **Antic** believes it's well worth taking notice of the informed opinions polled here.

James Capparell
Publisher

ATARI NEWS FROM CES

Worldwide™ Users Network

Latest products unveiled

CES EXCLUSIVES

For the latest on-the-spot Atari bulletins, direct from the Consumer Electronics Show in Las Vegas, type GO ANTIC when you log onto CompuServe in January. Lots of powerful new Atari computer hardware and software is expected to be unveiled at the winter CES.

WUN CHAIRMAN

An Atari users group officer, Joe Waters, has been named temporary chairman of the Worldwide Users Network (WUN). Waters is president of NOVATARI, the Northern Virginia Atari users group, and also edits the ambitious Current Notes publication of Washington Area ACE.

Chosen as temporary vice-chairman of WUN was Frank Nagle, president of Silicon Valley's BAAUG. The voting came during an online meeting of the WUN Board of Directors. A transcript of this meeting can be found in the WUN section of ANTIC ONLINE.

From now on, WUN policies will be set by users groups themselves. **Antic** and other corporations serving the needs of the Atari community will continue to provide organizational support.

PRO ST HELPLINE

520ST software developers are finding invaluable help in Professional GEM Helpline, Tim Oren's twice-monthly ANTIC ONLINE column.

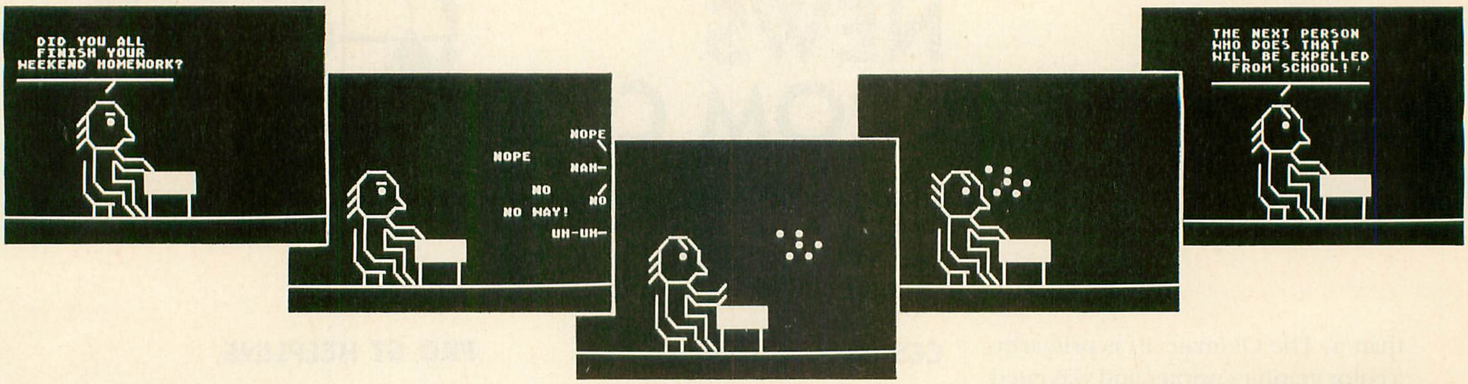
Every two weeks, Oren's column demonstrates advanced ST GEM programming techniques.

Oren is a former member of the GEM (Graphics Environment Manager) programming team at Digital Research, Inc. He designed and implemented the GEM Resource Construction Set and other parts of the GEM Programmer's Toolkit. Now at Activenture, Oren is designing CD ROM user interfaces for the ST.

SIGNING UP

If you're not a CompuServe subscriber yet, see your local computer dealer or phone (800) 848-8199 for information about signing up. Ohio residents phone (614) 457-0802. There is no extra charge for accessing ANTIC ONLINE or SIG*Atari.

ATARI'TOONS CONTEST WINNERS



The winning entry in **Antic's** Atari 'Toons Contest didn't use any fancy graphics such as redefined character sets or multiple colors, but every time the Antic staff booted up Brian Hastings' "Class," we got a hearty, non-stop, 60-second laugh.

"Class" depicted a teacher's vain attempts to cope with a roomful of unruly students. **Antic** bestowed the Grand Prize on this Atari 'Toon because it used slapstick comedy, facial expressions and humorous punchlines like a full-fledged animated cartoon. (We also liked the way the teacher's eyebrows rolled around when he got mad.)

Winning animator Hastings is from Durham, NC. He has owned his Atari for three years and likes to design games. Brian will now be logging onto his favorite bulletin boards at 1200 baud with his prize, an **Anchor Signalman Express** modem.

Before Player/Missiles or bit-mapping, there was a graphics technique known as "cursor art"—essentially a process of moving text and sets around the screen. **Antic's** cursor art contest was announced in the August 1985 issue. All entries had to be created with with Matthew Ratcliff's Atari 'Toons program from that issue and could run no longer than one minute.

. . . AND RUNNERS-UP

Five runner-up winners will each receive a copy of **HomePak**. This integrated software package from Batteries Included contains HomeTerm, one of the best telecommunications programs for the Atari.

"Help!" by Alan Kirk of Salem, OR, was a very close second-place winner. Using redefined character sets, Kirk created a detailed and highly artistic forest scene with lots of effective violet and green coloring. A smoothly moving human figure struggled to climb up a mountainous Atari fuji symbol. Just when all seemed lost, an airplane with an **Antic** banner flew by to drop a rescue rope via parachute.

"Wizard" was another close runner-up. A whimsical green wizard chanted silly magic spells and tossed sparkling fairy-dust that gradually formed into letters spelling out the word—you guessed it—**Antic**. Thirteen-year-old Edward Lim of Diamond Bar, CA, has owned an 800 for four years. He also crammed a game and four microscreens onto his 'Toons entry disk!

"Fireworks" was an inventive simulation of a pyrotechnical display. Albert Baggetta, a 40-year-old high school English teacher from Agawam, MA, managed to create the sparkling fireworks show without using redefined characters.

We appreciated the comically realistic Karate moves in "Martial Arts," by Peter Ritchie of Chesterfield, MO. Peter is 16 and has owned an Atari for 2 1/2 years now.

"Model Car Show" by Dennis Bennett, 35, of Torrance, CA displayed some beautifully detailed animated graphics. Dennis created his own character sets with Instedit from the Antic Catalog.

We'd like to thank all of the future Walt Disneys, Ralph Bakshis and Chuck Jones' who enthusiastically responded to the Atari 'Toons contest. (One perturbed entrant wrote, "Who the heck is Chuck Jones, anyway?" Trivia buffs can note that Jones created some of Warner Brothers' strangest cartoon characters, such as the Tasmanian Devil). Antic Disk subscribers will find all the winning entries as this month's disk bonus. We also plan to upload all six winning 'Toons onto CompuServe SIG*Atari.

PRINTER PICKS

New Epson, C. Itoh, Okidata models reviewed

by ERIC CLAUSEN

EPSON DX-10

Epson's first true letter-quality printer is targeted for the low end of the market at $299. But don't let the price fool you—Epson has come up with a fine product here.

The **DX-10** is capable of all the basic functions you'll need from a daisy-wheel printer. Boldface, underlining, subscript and superscript are all supported. In addition, by simple DIP switch selection, both 10 and 12 cpi (characters per inch) are supported without changing print wheels. Other type-styles such as italics require changing the print wheel, which is a simple pop-in process. Ribbon installation is also simple, just snap in a new cartridge.

As of this writing, single-sheet friction feed is standard. A tractor option for pinhole paper is planned, but not yet available. As with most third-party printers for the Atari, a Centronics parallel interface is required.

*(For extensive details about printer interfacing, see **Antic**, March 1985, page 33 and August 1985, page 16. Also, you'll find in-depth explanations of standard printer terminology on pages 23-25 of the March 1985 **Antic**—*ANTIC ED)

Print quality is excellent, as you can see in the accompanying sample. Epson rates the DX-10's speed at 10 cps (characters per second). In testing this printer myself, I found the claim to be quite accurate. In the 10 cpi mode, the printer performed at 9 cps, including linefeeds. In the 12 cpi mode, the printer tested out at 9.6 cps.

DX-10 text sample

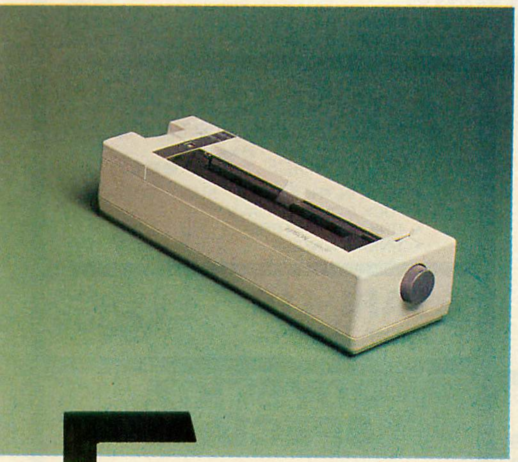
```
This is an example of
print quality and a
test of printing speed
```

Photography by Mary Rhomberg Lavery

For this review, I tested the speed of the printers under "real world" conditions—including line feeds and carriage returns that many manufacturers omit from their own rating tests. For each of the printers in this review, I timed the same text file from DOS 2.

Certainly the DX-10 is no speed demon, but when you consider all the fine features of this letter-quality printer for only $299, its slow output seems a relatively small trade-off. It seems as if letter quality for the masses has finally arrived!

And as with many other electronic products, you may soon find this printer discounted at various outlets. If you are thinking of adding a letter quality printer to your system, do yourself a favor and give the DX-10 serious consideration.



EPSON HS-80

Epson's entry in the portable inkjet printer market is its new **HS-80 LetterJet** printer for $449. Inkjet technology has quickly come a long way. It's remarkable that an inkjet unit this small is available at such a low price. (*In this issue, see the article about the Radio Shack Color Printer for a full explanation of inkjet technology.*—ANTIC ED.)

The HS-80 measures only 3.14 inches high, 13.5 inches wide and 4.72 inches deep. It is battery powered and weighs a mere 4.18 pounds. You could very easily carry the HS-80 between home and office in your briefcase. This would be ideal if you need a printer on the road, or if you need printers at two locations but only can budget enough for one printer.

Not only is the small size of the HS-80 ideal for transportation, it occupies very little desk space and is *very* quiet.

However, with any highly specialized printer you can expect some trade-offs. The main trade-offs in the HS-80 involve print quality and speed. This printer is on the slow side, I clocked it at 16.5 cps in correspondence mode and 40 cps in draft mode. And all inkjet printers presently need special paper with a smooth, glossy surface for best results.

I personally did not think that HS-80 print quality was much better than mediocre. For text, most standard dot-matrix printers seem to offer better-looking print. See the HS-80 text samples with this article and judge for yourself. However, as with most of Epson printers, graphics are a high point. The HS-80 was able to produce some very nice graphics dumps from B/GRAPH.

HS-80 text sample

draft mode

This is a speed and
type quality test for

correspondence mode

This is a speed and
type quality test for

The HS-80 is a normal Centronics parallel printer—you'll need an interface. It can be set up in minutes. Inkjet printers require an ink reservoir which can be messy to handle. Not the HS-80. Filling the ink reservoir has been simplified by special ink "syringes" that mate directly with a port under a cover on the front panel.

DIP switches are easily accessible on the back panel. A variety of printer functions can be manipulated through these switches. This is a battery-powered printer, but an AC adapter is included for recharging. Epson claims you can expect about 300 battery recharges before replacement.

A call to Epson America did not help me determine which other model would be the HS-80's closest relative for software compatibility. It appears that it is relatively close to the LQ-1500 and the FX-80 printers, and you might want to try using these drivers from your particular software package. Unfortunately, this important topic was not covered in the otherwise excellent documentation.

This printer definitely has its place. If portability is important to you, the HS-80 is a good value for your dollar.

C ITOH 8510 SEP+

This fast, solid dot-matrix printer is engineered for years of heavy use. C. Itoh has added a near letter quality (NLQ) mode to the already long list of features of their earlier 8510 model. At $549, this is not an entry-level model, and perhaps it would be best suited for an academic or business setting. Even so, the **8510 SEP+** could

continued on page 17

ATARI LIQUIDATION

ATARI 800

48K Color Computer **$69.99**

ATARI 400

Color Computer **$29.99**

NEW MODELS

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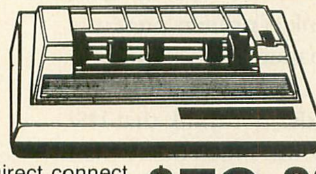

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- Panzer Jagd
- Controller
- Viet Cong
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Atari Pilot	$9.99	VisiCalc	$39.99
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WICO Bat Handle	$12.99
WICO Analog (5200)	$9.99
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WICO 12 ft. ext. cord	$3.99
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••• NOTE •••

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1-800-268-4559 Other Provinces

1-416-828-0866 In Toronto

Telex:06-218960
2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

continued from page 15

easily function as your first dot-matrix if you need a printer that's built like a tank.

Virtually everything you will ever need to do with a dot matrix printer is possible with the 8510. Aside from a 9 wire print head, the basic features include: full ASCII character set with true descenders, foreign language character sets, expandable 2K buffer, subscript, superscript, underlining, graphics, cpi modes of 5, 8.25, 10 and 16.5, double-strike, near letter quality, 180 cps (manufacturers rating), friction and tractor feed—an impressive list to be sure.

In my own test for speed, I counted the 8510 at a fairly zippy 102 cps in draft mode (including line feeds). I clocked the NLQ mode at 21 cps. The 8510's NLQ mode allows double-width characters and underlining. This printer achieves its NLQ mode by printing each line twice, with a slight offset for the second pass—for a combined matrix of 14×18. A print sample of both the NLQ and draft modes can be seen below.

8510 SEP text sample

draft mode

This is an example of
print quality and a

correspondence mode

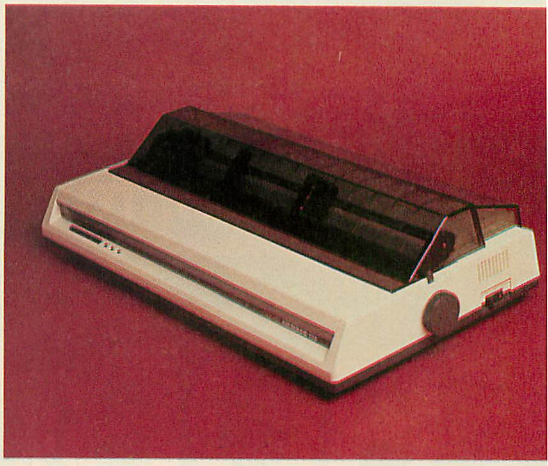
This is an example of
print quality and a

Most of the functions of the 8510 can be selected from 2 banks of easily accesible DIP switches. Of course, many printer functions can also be controlled from software.

The 8510 does everything well—as it should for $549. The printer has a 10-inch carriage, and both friction and tractor feeds are standard. Again, an interface is required to operate this printer with your Atari. The 8510 has a normal Centronics parallel input on the rear panel. Set-up is easy and the documentation is quite thorough.

If you want almost everything in a dot-matrix printer and don't mind paying a bit more, the C. Itoh 8510 SEP+ may be just for you.

OKIDATA 193



Okidata has scored a solid hit with its latest entry, the model **193** dot-matrix printer. This is a fast, wide-carriage (15 inch) relative of the older Okidata model 93.

Before I overflow with praise for this fine printer, I should make the point that at $699, the 193 was specifically designed for heavy-duty business applications. Therefore, if you're a casual printer user, the 193 may not be for you.

The Okidata 193 is very easy to set up in a few minutes—even for the most inexperienced user. The documentation is nothing short of great, virtually every aspect of the printer is covered in complete detail, in literate English. The styling of the printer is sleek and ultra-modern. It would blend perfectly into any high-tech decor. The Oki 193 also features a standard Centronics parallel interface and 8K memory buffer.

Beyond the basics, some of the features of the 193 are quite unusual. Users can program 19 functions from the front panel, without DIP switches. This is a great convenience, no more hunting for sometimes well-hidden switches and laboriously figuring out what they do. You simply and easily step through a Menu Select Mode and configure your printer for any conceivable task. These user modifications remain in the printer's memory, even after it's turned off.

Some of these front-panel features include: lines per inch, characters per inch, emphasized and double-width, correspondence mode (same as NLQ), auto line feeds, foreign language fonts, proportional spacing. You may mix many of these various modes to really customize your printed output. Okidata's printer speed claims are much closer to reality than many other manufacturers'. Their draft mode rating was given as 160 cps, while I clocked it at 114 cps. However, they rated the 193's correspondence mode speed at only 33 cps, but I found it to be a faster 36 cps.

The 193 also features dot-addressable graphics which allow highly detailed screen dumps—using proper software—at up to 3,916 dots per line resolution. The Oki 193 will also accept downloaded fonts and print them in correspondence mode. If you need a printer for very heavy word processing output, or you frequently print out large spreadsheets (you can get 233 characters per line in 17 cpi mode), the 193 is well worth its $699 price.

OKIDATA 193 text sample

draft mode

This is a speed and
type quality test for

correspondence mode

This is a speed and
type quality test for

MANUFACTURERS

EPSON DX-10 ($299)
EPSON HS-80 ($449)
Epson America, Inc.
2780 Lomita Boulevard
Torrance, CA 90505
(213)539-9140

C. ITOH 8510 SEP+ ($549)
C. Itoh Digital Products
1011 Francisco Street
Torrance, Ca. 90502
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OKIDATA 193 ($699)
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MOVIT 916, "Peppy" Peppy is a tiny but vivacious robot, equipped with a two-way sensor which responds to both obstacles and sound. When the sensor located in front comes into contact with a wall or other obstacle or hears a loud noise, such as a hand clap, it will automatically turn to the left. (Sensor/control PC board ready assembled.) *$23.50*

MOVIT 918, Memocon Crawler This robot runs as per the program you input by means of the key board. The key board has 5 different switches, forward, to the right, to the left, pause, sounds a buzzer and lights up (beams). This robot employs a sequence function static RAM 256X4 bit memory. $69.95 (Apple II interface is extra, part #MC-AP, $37.50)

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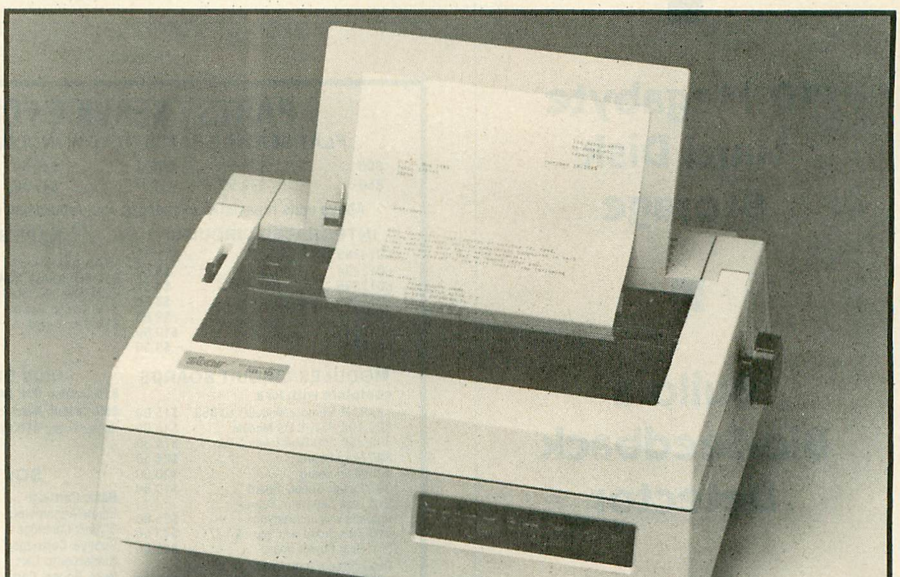
ULTIMATE DOT-MATRIX PRINTER

24-pin Star Micronics SB-10

by PATRICK BASS, **Antic** ST Program Editor

With a suggested retail price of $749, the 24-pin dot-matrix **Star SB-10** is the top-of-the-line printer from Star Micronics. **Antic** has been waiting eagerly for this printer since we saw it in action at the Consumer Electronics Show. Starting with this issue, our SB-10 will be typesetting the magazine's program listings.

By using 24 wires in the printhead, instead of eight or nine wires like standard dot-matrix printers, the Star SB-10 can produce a print quality nine times denser than before. The result is a typeface that looks, to the naked eye, exactly like letter-quality daisy wheel printing.



In addition to true letter-quality, the Star SB-10 prints text in pica, elite, condensed, proportional, expanded, emphasized and double-strike faces. If you like, you can mix and match print styles on a single page. And naturally the printer also does a top-notch job on graphics.

The SB-10 has a standard Centronics parallel connector. An optional 128K character buffer will be offered later. Two banks of DIP switches are inside the front cover. The first bank controls the default power-up configuration, while the second offers a choice of eight international character sets.

For a speed test, we created a document of 6 paragraphs with 10 lines of 70 characters each. That's 4200 letters per document. The SB-10 printed a draft copy in 55 seconds, and a letter quality copy in 1:54. This translates to 77 draft characters per second, and 37 cps in letter quality. While not a speed demon, the SB-10 is a reasonable combination of both daisy wheel and dot-matrix printer speeds.

continued on next page

Star did a fairly good job with their SB-10 documentation—they included examples of commands wherever practical. However, a two-page index for a 146-page manual seems a bit small.

Antic has printed about 2,000 pages on the SB-10 without failure. Both continuous or single sheets of paper can be used, and the tractor feeder is built-in. You may not have an easy time finding replacement T464 ribbon cartridges for this printer. However, a few phone calls to specialty computer stores revealed that the more commonplace Toshiba 1350 cartridge can safely be substituted.

Any more quibbles? Well, the Star SB-10 is not exactly what we'd call a quiet printer. But we learned to enjoy hearing the sounds it makes as it produces those clean, smooth Atari special characters you'll see in this month's **Antic** listings.

We had to write a 24-pin font editor and graphics dump program for 8-bit Atari computers before we could create a new 24-pin character font for the Atari character set—without jagged diagonal lines. We could have produced any typefont we needed, but we believed it was important to keep the flavor of the characters that show up on the Atari screen.

The increased resolution of the SB-10 printouts also enabled us to clarify many of the special characters that have been giving trouble to **Antic** readers. On this month's Typing Special Atari Characters page, notice how much clearer the sample characters look. So no more getting a [CONTROL] [S] cross mixed up with a plus sign, eh? Notice also how each character's curves are now curvy and all the diagonal lines now diag properly.

STAR SB-10
Star Micronics, Inc.
200 Park Avenue
New York, NY 10166
(212) 986-6770
$749

RADIO SHACK COLOR PRINTER MEETS ATARI

Best color printing under $1,000?

by STAN and SUZI SUBECK

This article reviews the Radio Shack Color Inkjet Printer and describes how to use it with the Atari. Included is a program that prints standard Micro-Painter graphics files as color screen dumps in Graphics Mode 7.5. This BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.

Do you want the best multi-color printing available for the Atari—as well as highly readable correspondence-quality text? We're afraid you'll have to think about spending $699 on a Radio Shack CGP-220 Color Graphics Printer.

Sure, $699 is a lot of money. But the Subeck family is glad we convinced ourselves the CGP-220 is a bargain and we have thoroughly enjoyed owning ours. Canon, the actual manufacturer, markets the identical printer under its own label for $799. Canon also produces it for Quadram, who markets it as "IBM compatible" for $899. Anyway, until recently you couldn't come close to this level of color printing without spending several thousand dollars.

(If you would like to compare the CGP-220 to its nearest competitors, please refer to the March, 1985 ***Antic*** *article, New Color Printers, which reviews the $208 Okimate 10 and the $599 Seikosha GP-700A. These printers cost a lot less than the Radio Shack entry and predictably they deliver a lot less, although the Oki is a good value at its current price when used with* ***RAMbrandt*** *software, $19.95 from the Antic Catalog.*—ANTIC ED)

As you can see from the sample illustrations on these pages, this color printer delivers genuinely beautiful screen dumps. Our daughter Lisa made big bucks selling her classmates book covers imprinted with the names of rock groups like Duran Duran and Wham for 25 cents apiece.

THE PROGRAM

Stan wrote a simple BASIC printer driver that accompanies this story. The program prints standard Micro-Painter graphics files as Graphics Mode 7.5 color screen dumps.

The CGP-220 Screen Dump is written in BASIC. When run, it will generate the necessary machine code to speed up the print-out time. Type in Listing 1, check it with TYPO II and SAVE a copy before you RUN it.

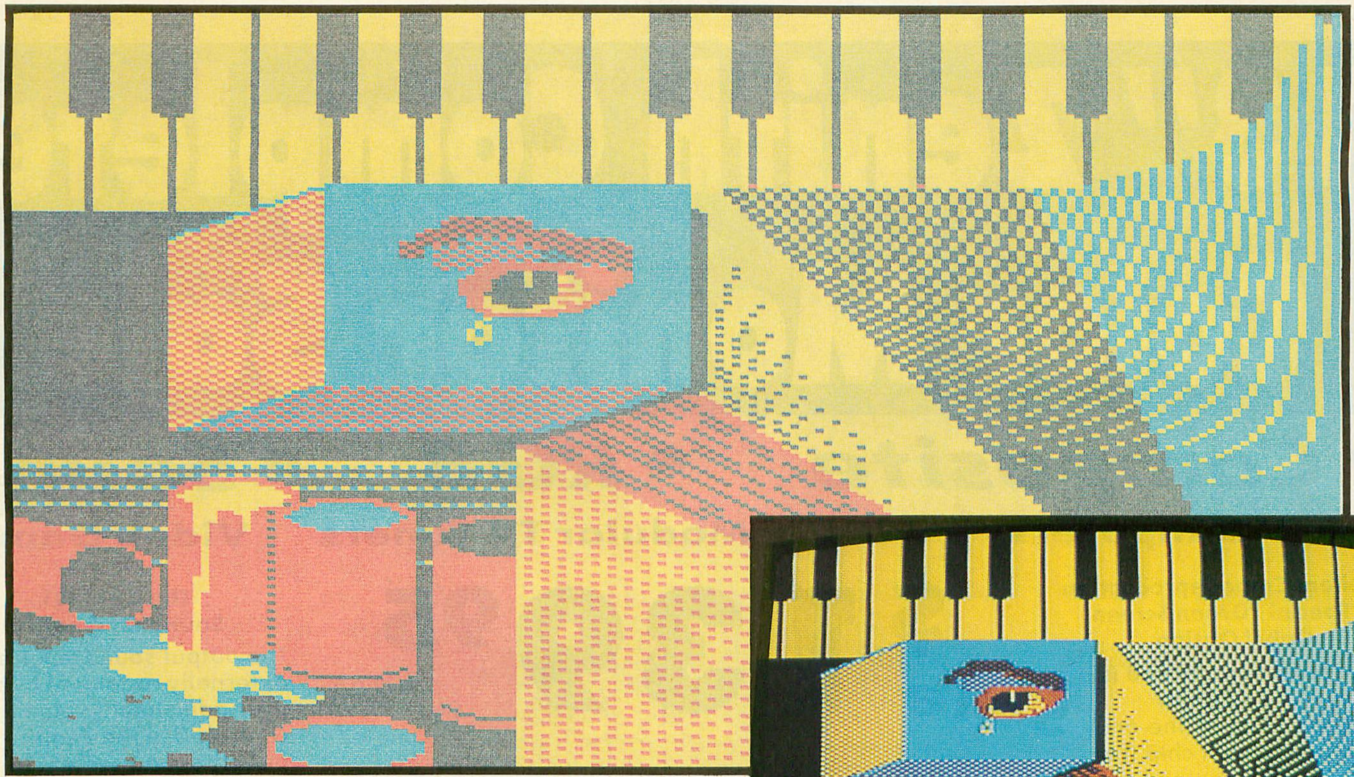
COLOR INK JET

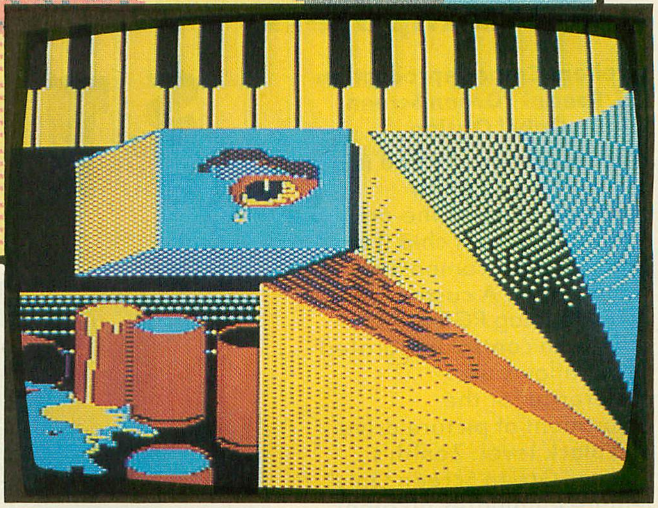
The CGP-220 is an ink jet printer like the Hewlett-Packard Thinkjet that **Antic** reviewed in the March 1985 Printer Issue. However, this Radio Shack printer uses four ink colors to reproduce as many as 25 colors in a single graphics dump.

As usual, since the CGP-220 is a third-party product, it does require a Centronics parallel printer interface. The Atari 850, the MPP MicroPrint and the ATR-8000 all seemed to work quite well.

Ink jets work by actually squirting a small quantity of ink from a reservoir through a tiny hole onto the page. (A special high-absorbency paper is recommended.) The actual image depends on the timing and distance between squirts. Just like dot matrix printers, ink jets can reproduce text and graphics.

The CGP-220 uses two ink cartridges—black and tri-color—that will each print as many as 4 million characters. The cartridges are easily replaced from the front of the printer. The tri-color cartridge costs $14.95 and contains the primary colors—





Radio Shack CGP-220 printout of a microscreen by Bernard Taylor of Roseville, California. Antic Disk subscribers will find this microscreen as a bonus file titled KEYS.MIC.

cyan, yellow and magenta. Mixtures of these colors produce red, green, blue, yellow, magenta and violet. The $9.95 black cartridge can be used for borders between colors or for correspondence quality text.

```
jet printers varies widely
with lots of space between
and is typical of early do
```

text sample

The text sample printed here is in straight draft mode. The CGP-220 also has an enhanced density mode that creates darker letters. Standard text characters are formed as a 5 x 7 dot matrix, through seven passes of the single ink-jet nozzle. (***Antic*** *clocked the text printing speed of the CGP-220 at a rather slow 26 characters per second.*—ANTIC ED) The printer's slowness is partially compensated for by its incredible silence. You could hear a whispered conversation while this machine is operating.

The text mode supports the standard ASCII character set, CHR$(32) to CHR$(127), as well as a 64-character European set, CHR$(160) to CHR$ (223). Characters may be printed in either standard size or double width.

COLOR MODES

In the first of the two graphics modes, known as the bit image mode, 640 columns of seven dots each may be printed across a page. Any of the seven dots is printable, and each column can be in one color. Because this mode is essentially the same as that which is used by the Epson, currently available screen dumps require no more than minor conversions to produce clear, single color prints.

The second graphics mode is the Color Scan. This mode affords greater flexibility in color mixing. Printing is based on horizontal rows of eight dots, in which each dot may be a different color. By using the proper shading, virtually any color may be produced. High resolution screen dumps are possible in this mode, by using RGB mixing in a manner similar to that which is used by television monitors.

The CGP-220 accepts paper either in rolls or single sheets. Despite the lack of a tractor feed, there is no problem with paper slippage. The paper roll is conveniently top-mounted under a hinged dust cover. The printer supports line feeds of 1/6-inch and 1/8-inch. It can also tab to any of 360 dot positions on a line.

The accompanying manual is 50 pages of straightforward technical information that's accurate and easily understood. The CGP-220 supports only 14 different control codes, so a complicated instruction manual is not necessary. However, don't expect to find any specific Atari information included.

RADIO SHACK CGP-220
Tandy Corporation
1700 One Tandy Center
Fort Worth, TX 76102
(817) 390-3300
$699

This is Stan Subeck's first published program in ***Antic****. However, Suzi "Call Me Modem" Subeck is a familiar name to readers of this magazine.*

Listing on page 89

13" Zenith Complete Color Monitor Sale

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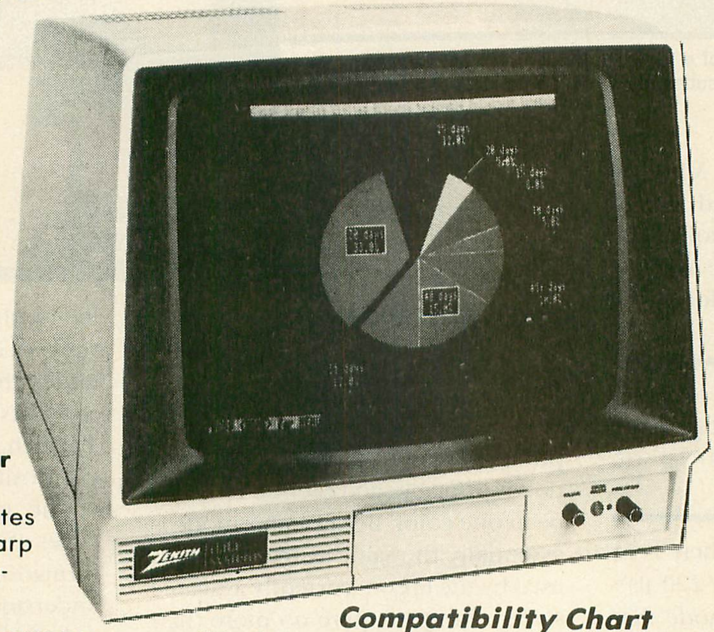

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True color reproduction is achieved by a Zenith designed state-of-the-art integrated circuit chip that processes the composite video signal. A custom Zenith analog RGB direct drive gain control integrated circuit allows user-preference for the adjustment of picture drive and black level. Zenith's unique "Green Screen Only" feature eliminates all other colors so that monochromatic text material may be easily displayed in green on the black face screen.

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Sale $139.95

ZVM 131-Accessible by Many Popular Systems

The ZVM 131 is designed to interface with most personal computers, VCRs, video discs, video games and modular TV tuners that have either composite video or RGB direct drive outputs.

Compatibility Chart

Computer	Interfaces Via
Apple II	Composite
Aplus 3000	RGB
Apple III	RGB
IBM PC	RGB
Commodore 128	RGB/Composite
Commodore 64	Composite
Commodore Vic-20	Composite
TI 99/4	Composite
Atari 800	Composite
Atari 1200	Composite
Atari 1400	Composite

The ZVM 131 Sound Of Quality

The output sound level is externally regulated by a user-adjustment volume control. Use the Zenith quality sound system to monitor the modern audio capabilities of the computer generation.

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ZVM 131's 13" diagonal display screen can exhibit impressive graphics and intensely clear copy. Easy-to-reach front access user controls (picture, black level, color level, tint, sharpness, audio volume, background noise control) make display adjustment simple and fast. An LED power on indicator notifies the user when the monitor is operable.

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The composite video "loop-thru" feature permits a single composite video source to drive several monitors at the same time. This allows easy display possibilities for multiple viewers in business and educational applications. No more crowding around a single terminal. Everyone enjoys a clear, unobstructed view of important data.

Connection Cables **RGB Cable — $19.95** C128, Aplus 3000 (Specify) **Composite — $9.95** Commodore, Aplus 3000, Atari (Specify)

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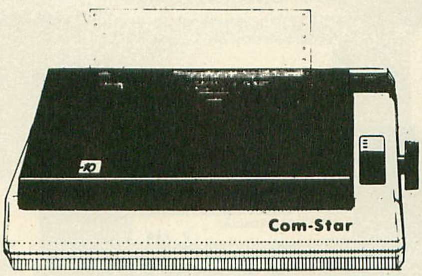
List $399.00. **Sale $179.00.**



List $599.00 **15½" Printer**

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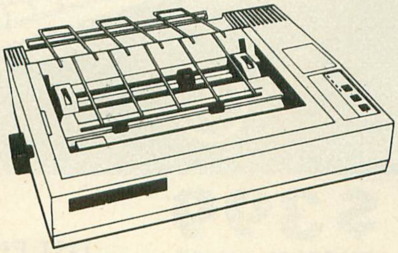
1 Year Warranty

150-170 CPS

High Speed

10" Comstar 160+ High Speed — This Bi-directional Tractor/Friction Printer combines the above features of the 10" Comstar 10X with speed (150-170 cps) and durability. Plus you get a 2K buffer, 96 user definable characters, super density bit image graphics, and square print pins for clearer, more legible print (near letter quality). This is the best value for a rugged dependable printer. (Centronics parallel interface.)
List $499.00. **Sale $229.00.**



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Lifetime warranty*

165-185 CPS

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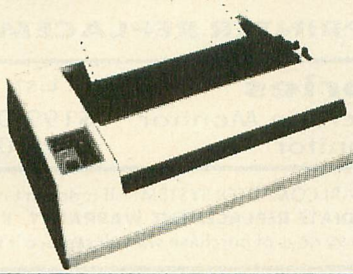

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CREATE A TWO-HEADED PRINTER CABLE

Double your printing ease, double your fun

Are you a two-printer owner? Connect both printers to your Atari and switch between them effortlessly with this homemade cable. As written, the design requires an Atari 850 interface. But the more adventurous should be able to adapt this principle for other set-ups. You will also need some soldering skill and a few bucks worth of parts.

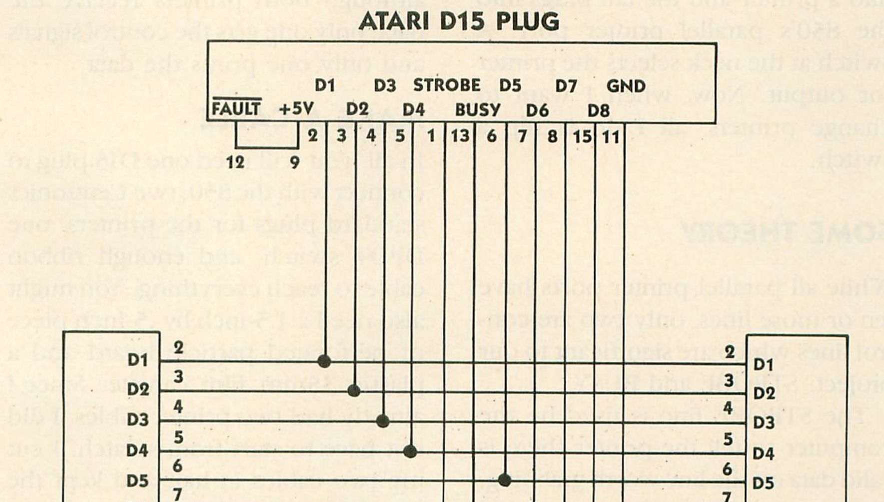
*The following article assumes knowledge of hardware. We have taken every step to ensure that the information contained herein is correct, but **Antic** cannot take responsibility for, nor give assistance on, readers' hardware projects.* —ANTIC ED.

by HANS HSU

I recently added a second printer to my Atari system, giving me both daisy-wheel and dot-matrix capability. But since the Atari 850 interface provides only one parallel port, I found myself in a tangle of interface cables, constantly uplugging one printer and plugging in the other. I quickly grew tired of all this and decided to invent a better way.

I found that with a double-pole, double-throw (DPDT) switch and a little soldering, I could convert my two printer cables into one double-headed cable. Each of the heads plugs

continued on next page



NOTE: Centronics plug pinouts vary for different printers. Check your printer manual carefully.

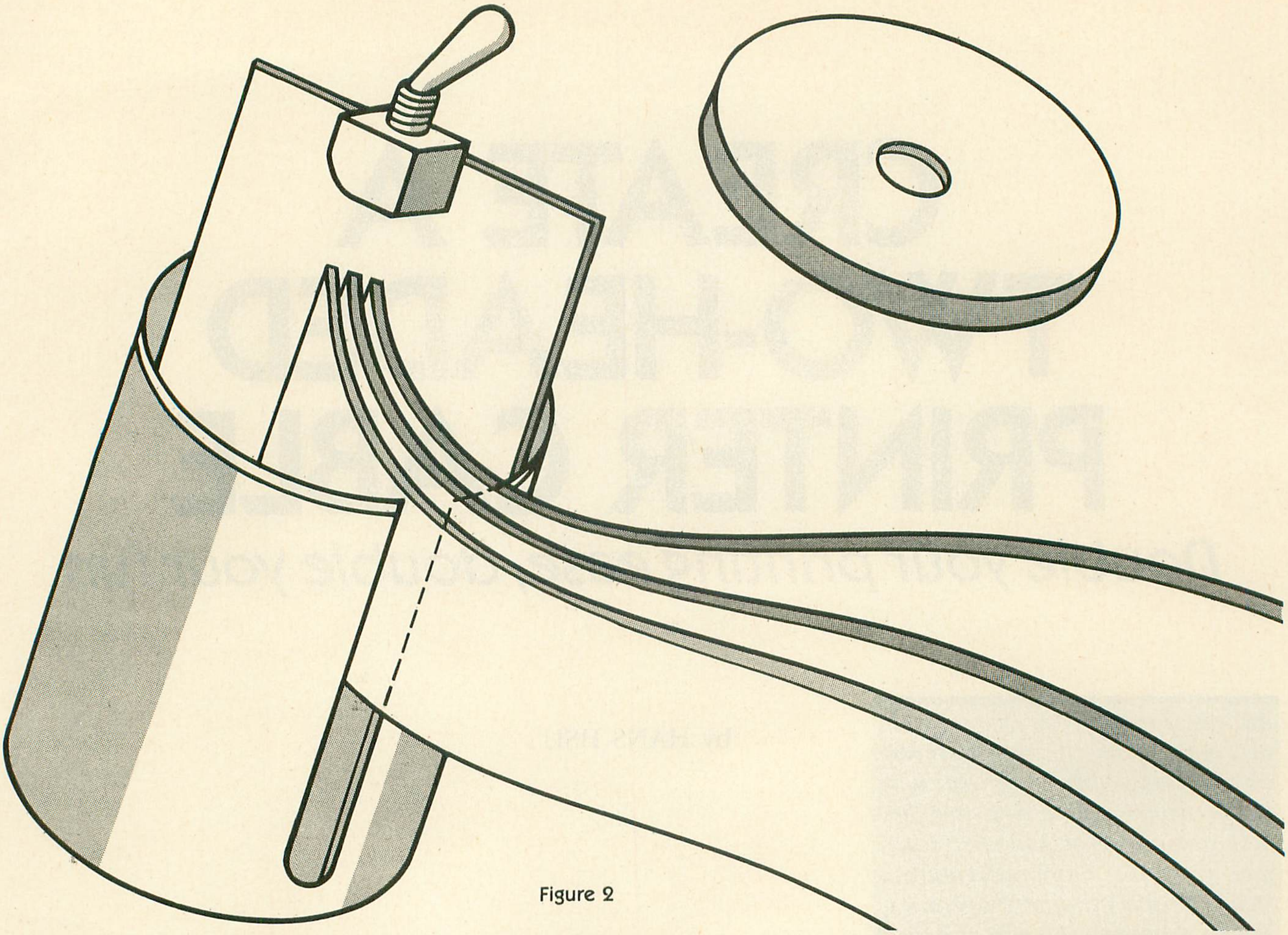


Figure 2

into a printer and the tail plugs into the 850's parallel printer port. A switch at the neck selects the printer for output. Now, when I want to change printers, all I do is flip a switch.

SOME THEORY

While all parallel printer ports have ten or more lines, only two are control lines which are significant to our project: STROBE and BUSY.

The STROBE line is used by the computer to tell the printer there is valid data on the line worth grabbing. Without the STROBE line, you could send data to the printer forever and nothing would get printed. The BUSY line is used by the printer to tell the computer it's ready to receive data.

NOTE: Pinout locations for Centronics plugs vary between different printers. Check your printer manual carefully.

Now, we use the DPDT switch to send these two control signals only to the printer we've selected. So although both printers receive the data, only one gets the control signals and only one prints the data.

MAKE A CABLE

In all, you will need one D15 plug to connect with the 850, two Centronics standard plugs for the printers, one DPDT switch, and enough ribbon cable to reach everything. You might also need a 1.5-inch by .5-inch piece of perforated particle board and a plastic 35mm film canister. Since I already had two printer cables, I did not have to start from scratch. I cut my two cables in half and kept the two Centronics plug ends and one of the Atari plug ends.

Solder the data lines of the three cables together. Solder the STROBE and BUSY lines to the DPDT switch. See *Figure 1*. Mount the DPDT switch on the .5-inch side of the perforated vector board, and make sure the toggle of the switch protrudes past the .5-inch edge.

Now cut a vertical slit in the film cannister, just wide enough for all three ribbon cables, and insert the vector board with the ribbons trailing out from the slit. Cut a small hole in the canister lid for the protruding toggle-switch and slip the lid back onto the canister. See *Figure 2*.

Assuming you have made all the right connections, you should now be the proud owner of a two-headed printer cable. To test it, connect the cable to both printers and your 850. Make sure both printers are online, then print something. One of the printers should respond. Now flip the switch to send something to the other printer. Note the position of the switch and mark it accordingly.

Hans Hsu sent in this article from England where he recently received an M.A. in Computer Science from Cambridge University. He designed JaneCalc for Arktronics Software and was a development engineer for Hewlett-Packard.

MASTERING THE ATARI 1020 PLOTTER

Tutorial with demonstration programs

by KRIS CRUZ

Learn how to use the graphics power of the inexpensive Atari 1020 Color Plotter. This tutorial article provides a complete explanation of the 1020 commands plus four short demonstration listings. The BASIC programs work on all Atari computers of any memory size, with disk or cassette.

The Atari 1020 Color Plotter is a very useful and inexpensive printing tool. It lends itself to a wide variety of applications from geometry and physics diagrams to home finance graphs or even just high tech doodling! (*See the October, 1985* ***Antic*** *for more information about the 1020, including where it can be obtained.*—ANTIC ED)

There are two general modes of operation—text and graphics. In the text mode you have a choice of 20, 40 or 80 column text in four different colors. You can also have the text rotated 90, 180, 270 or 360 degrees. This feature can be used to produce bright and colorful banners.

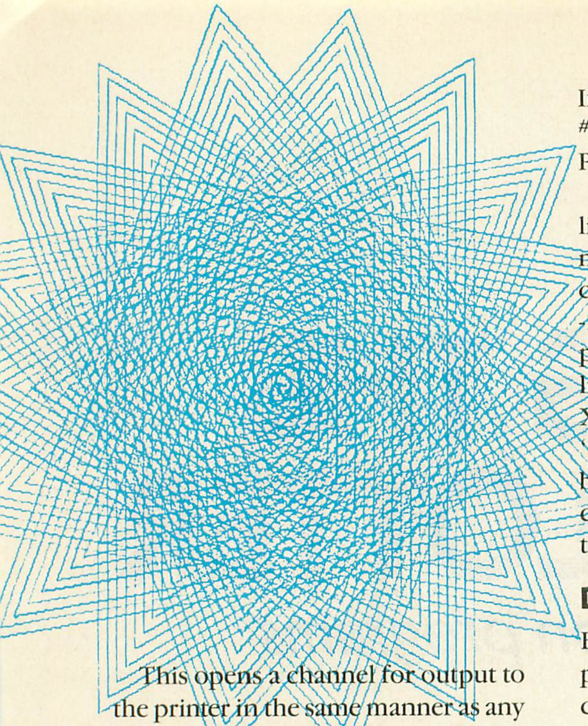
In the graphics mode you can use X,Y coordinates to plot graphs. You can also specify where you would like the axis drawn for your graph. Basically, if you are familiar with plotting and drawing on the screen, then you should have little trouble using the 1020 graphics mode. *Figure 1* summarizes the text and graphics commands.

Figure 1

INSTRUCTION	**FORM**	**MODE**
GRAPHICS	ESC ESC CTRL G	—
TEXT	DEFAULT	AT CHANNEL OPENING
TEXT	A	TEXT FROM GR.
20 COL. TEXT	ESC ESC CTRL P	TEXT
40 COL. TEXT	ESC ESC CTRL N	TEXT
80 COL. TEXT	ESC ESC CTRL S	TEXT
HOME	H	GRAPHICS
PEN COLOR	C (VALUE 0-3)	GRAPHICS
LINE TYPE	L (VALUE 1-15)	GRAPHICS
0=SOLID	—	—
DRAW	DX,Y	GRAPHICS
MOVE	MX,Y	GRAPHICS
ROTATE TEXT	Q (0-3)	GRAPHICS
(Text to be rotated must start with P)		
INITIALIZE	I	GRAPHICS
(Sets current X,Y as HOME or 0,0)		
RELATIVE DRAW (Used with Init.)	JX,Y	GRAPHICS
RELATIVE MOVE (Used with Init.)	RX,Y	GRAPHICS
CHAR. SCALE	S (0-63)	GRAPHICS

The commands are not difficult to use. But they must be sent in a manner which the plotter can understand. First, you must OPEN a channel to the 1020. Type: OPEN #2,8,0,"P:".

continued on next page



This opens a channel for output to the printer in the same manner as any other device. You are now automatically in the 40 column text mode. Any text you send out through a PRINT #2 statement will be printed in 40 columns. Next type: PRINT #2;"[ESC] [ESC] [CONTROL] P". Now everything is printed 20 columns wide.

For 80 column text, type: PRINT #2; [ESC] [ESC] [CTRL] S. To print different colors, press the color button between printings or type: PRINT #2; [ESC] [ESC] [CONTROL] G [RETURN]. And then type: PRINT #2;"C(any # 0-3)" [RETURN] PRINT #2;"A". Notice how the pen barrel is rotated to change pens. Numbers for the different pen colors are shown below:

#	COLOR
0	Black
1	Blue
2	Green
3	Red

There are nine commands within the graphics mode. OPEN a channel to the plotter and type: PRINT #2;"[ESC] [ESC] [CONTROL] G". This sets the plotter in the graphics mode.

The DRAW command is much like DRAWTO in BASIC. But with the plotter, X can be from 0 to 480 and Y can be from -999 to 999. The line is drawn from the current position to X,Y. Type: PRINT #2;"D450,0". This draws a black line across the paper and stops.

To have the pen barrel return to its HOME position, type: PRINT #2;"H". If you want dotted lines, type: PRINT #2;"L(any value 1-15)". Then type: PRINT #2;"D450,-10".

To plot points, you must be able to lift the pen from the paper while moving it. This requires the MOVE command. Type: PRINT #2;"M200, -200". The paper moves up and the pen moves to the center. However, no line is drawn. Now add 1 to either the X or Y and DRAW. Type: PRINT #2; "D200,-201". This is how points can be plotted. But usually the pen is left down to show the shape of the function being plotted.

DEMO PROGRAMS

For demonstrations of fundamental plotter patterns, type in Listings 1-4, checking each line with TYPO II. SAVE a copy of each listing before you RUN it.

Listing 1 shows how the functions of SIN, COS and TAN look when plotted. You will notice in lines 15, 30 and 50 that an asterisk [*] can be used to send more than one command in a single PRINT statement.

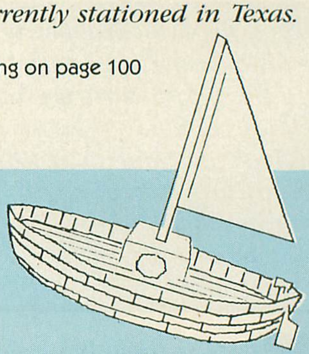
Listing 2 draws two groups of concentric circles which cross each other. Listing 3 draws spiraling triangles. It does this by changing the radius and the points where it connects the triangle.

Listing 4 draws two squares and connects each of the corners with a line. It can easily be modified to do the same for other shapes, by changing the step and the data representing which points to connect.

As you can see, there is much you can do with the Atari 1020 Plotter. Until recently, such features cost upwards of $2,000, but now Atari users can get the same kind of high tech plotting for under $50. And even if you aren't interested in making graphics or charts in four colors, for much less than the cost of a dot-matrix printer you could purchase a 1020 simply to list your programs.

Airman First Class Kristofer Cruz is currently stationed in Texas.

Listing on page 100



PRINT 'N DRAW
Terrific Software
17 St. Mary's Court
Brookline, MA 02146
(617) 232-9686
$14.95, 48K disk

Reviewed by ERIC CLAUSEN

Print 'n Draw is a new commercial utility for the Atari 1020 Color Plotter. It is easy to use, yet sophisticated and offers many practical features at a reasonable price. (For more about available 1020 software, see the September, 1985 **Antic**.)

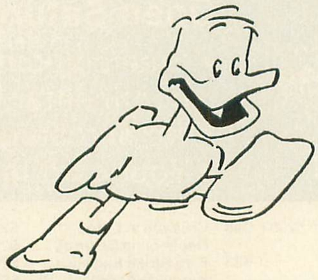
The program creates a variety of banners, pie charts and text styles directly from the main menu, providing all necessary prompts. In addition, 26 sample picture files are included, many of them quite detailed. Graphics Magician picture files can also be dumped to the plotter via Print 'n Draw.

This software is recommended for ages 8 to adult. But play-testing with a 6-year-old revealed that even younger children may find the package to be a fascinating drawing tool. I personally found myself (age 29) enjoying the program as well!

Print 'n Draw is written in BASIC and is well error-trapped. The owner's manual, while quite friendly and useful, is not really needed because the program is so easy to use.

It should be understood that Print 'n Draw is not capable of the sophisticated graphics produced by some of the more expensive and complex plotting programs available for Atari. The intent of this program is to provide instant access to the basic functions of the 1020 plotter with a minimum of fuss.

Print 'n Draw is highly recommended for all 1020 owners, particularly those with children, who want a simple but effective plotter program.



JOYCE HAKANSSON'S FANTASY FACTORY

Ducks Ahoy software

Erik Weber

by GIGI BISSON, **Antic** Assistant Editor

It looks more like a nursery school than the office of the president of a successful educational software development company.

Joyce Hakansson is surrounded by wind-up toys, posters of mythical horned gods, Kermit the Frog puppets and a stuffed model of the **Ducks Ahoy** duck. She looks around the room, smiles broadly, and says, "I suppose I never grew up. . ."

Maybe that childlike quality is the secret to the success of Joyce Hakansson Associates, the developer of best selling educational software such as Ducks Ahoy and the **Sesame Street** programs for publishers like Spinnaker, CBS Software and Milton Bradley.

"I know kids, I'm able to put myself in their place," she says in a soft, almost childlike voice. She has a quality of enthusiasm and wide-eyed wonder that is rare in the computer industry. When she speaks of possibilities, it's hard to listen without being swept away to a world of flying bananas and dancing bathtubs where computers make it possible for anything to happen.

Hakansson's Berkeley, CA office is within rumor distance of the Silicon Valley, but far away in spirit. It's not part of a low-slung, prefabricated industrial park. Instead it occupies a fanciful, candy-colored, gingerbread-style Victorian house that could have been transplanted from Disneyland's French Quarter. Who knows, that may be intentional—she says Disneyland is enchanted and her favorite place on earth.

This successful business is a long way from Hakansson's first encounter with computers as a housewife in 1973. Her children were having trouble with mathematics in school. So Hakansson approached the principal and asked if she could start a computer math lab.

She recalls that the principal said, "Sure, lady, do what you want. But we don't have any money." Like many school computer labs, it was financed with bake sales. Eventually the school got some timesharing on the computers at the Lawrence Hall of Science.

In 1979 she went to work for the Children's Television Workshop and started their software division. Later, she created her own little Disneyland—the Computer Gallery at Sesame Place, a roomful of computers at a Sesame Street theme park in Langhorn, Pennsylvania.

THE JOYCE-TEAM

Hakansson is the antithesis of the programmer who does everything from code to graphics. The Joyce Hakansson Associates are just that—associates. Everyone constantly refers to "the team." Group photos of the team adorn the office walls. It's sort of a socialistic approach to programming. Nobody takes credit, least of all, Joyce.

She insists she doesn't have much to do with the software. She knows how to program, but says she's not a programmer. She can't draw. So what does she *do*?

"Oh, I have the easy job," she says. "I just sit back here and have fun."

Meanwhile, a talented crew of artists, musicians, educators, programmers and writers buzz around the office. Not surprisingly, most of them are young. Suprisingly, most of them are women.

"Ideas are cheap," Hakansson says. But talented people aren't. She hires people with no experience at all in computers. That's because you can always teach someone about computers, but you can't teach them how to be creative. She says, "I look after them and respect them, and in turn they help me implement an idea that lives in my head."

Above her desk is a bright poster that proclaims: Creativity—the human resource. Here, it's the only resource. Neckties are scorned. Craziness is encouraged. The atmosphere produces things like this goofy joke in the Ducks Ahoy users manual: Who comes out at night, wears black, drinks blood and quacks? Quackula.

Cartoonist Bud Luckey demonstrates a vocabulary game he helped design. Gonzo from Sesame Street is a chickenphile with a rather kinky obsession with eggs. So it's full of bad egg puns, like "eggceptional" and "eggcellent."

Today, they're working on a yet-untitled game for Activision that teaches the principles of electricity. And they are finishing up **Passport to Paris** and **Passport to London**, two complex adventure games that teach everything from history to foreign language and customs.

Here's the team approach at work. Ruth Young, the animator, is trying to demonstrate Passport to London, but doesn't know how to play it. So she calls over Bud, the artist. He can't really figure it out either. The programmer is summoned, but he just wrote the code. Nobody can play the game, they surmise, because the writers haven't written the manual yet.

GAMEBUSTERS

Three or four times a week, busloads of kids come in from day care centers and stream into the big victorian house to play with Joyce Hakansson Associates software. They call the kids "Gamebusters."

If a program isn't finished yet, they make a storyboard or picture of it and ask kids what they think. The kids believe they're on a field trip. They have no idea that they're playing a major role—for free—as software consultants. Meanwhile, a full-time employee with a PhD in child development writes a report on how kids relate to the programs.

If there are any public relations people or marketing gurus around, they're nowhere in sight. JHA has the luxury of not needing to worry about publicity or sales—that's all left up to the software publishers like Activision and CBS.

COMPUTER FEAR

If there is a force driving Joyce Hakansson, it's a crusade to conquer computer fear. "That's why I started my business. If kids find computers friendly at an early age, they won't have to go through what I did."

She was terrified of math as a child. "It was something that boys did," she recalls. Later in life, she felt cheated.

"All of us in the industry are going to have to take care of computer fear. If we want people to be responsive to our products, we're going to have to think seriously about that problem," she says. "Unless that starts to happen, we'll be a lonely few."

Drill and practice programs are boring, she believes. Kids will do them in school only because there's a teacher forcing them to use it.

Things are different at home. Home computer education software has to compete for kids' attention against TV, videogames, the radio and their friends. "So it has to be even more entertaining," she says. And it also has to be easy. "They're not going to spend a lot of time reading manuals."

GENTLE GAMES

But something else sets apart the Hakansson games. In Ducks Ahoy, a game for pre-school children, cute little ducks are picked up in gondolas and paddled around canals in Venice. They have to watch out for hippos—but unlucky ducks don't get gobbled up, shot or eaten. The hippos just dump the boats into the water.

In Passport to London, there is an exciting, James Bond kind of danger element, but there are no guns or weapons.

All of this is intentional. in fact, there are non-violent standards that games must adhere to in order to receive Hakansson's approval.

"When you play any game, even in an arcade, you are learning something. Even if it's no more than eye-hand coordination, even if it's subconscious. When you have a game that rewards violence, you're teaching kids that aggressive behavior is the way to win." As an example of this kind of agression-teaching game, she cites typing tutorials which fire off letters like little missiles.

continued on next page

education

"Sometimes I wonder—are we teaching math and pattern association, or are we training future missile controllers?" she says. She thinks the most important thing you can teach a child is not how to fight—but how to cooperate.

All this may be the influence of the neighborhood—the office is a stone's throw from the University of California, Berkeley campus where her husband is a professor. The town has a roots of anti-war activism and feminism that began in the '60s. Her stand, however, is not political, but personal.

COMPUTER FEMINISM

As one of the few female executives in the software industry, Hakansson clearly understands the power she has for influencing and changing the role of women in computing.

"First, it's not uncommon for women to fear math," she says. "Secondly, they're generally not machine oriented. If the the garbage disposal breaks down, most women aren't going to tear it apart," she says. "Research has shown that the only machine women usually will tinker with is a sewing machine."

For women, computers are a limited resource. There are one or two computers in a classroom—if you're lucky. "A child has to be aggressive to get to them, and boys tend to be more pushy about it." she says. "Women use the majority of computers in the office. There's a lot of power there, but they don't realize it yet."

"Violent games also dramatically turn off girls from computing, we've found," Hakansson says, with the child-like wonder in her voice being replaced by concern. "It's too close to reality for them."

But with a computer, you can create some of your own reality. "It's like theater," she says, as the magic returns to her voice. "The computer is a little world you can enter." This is her Disneyland under glass, a stage where kids can do more than sit in the audience—they interact and become part of the show.

"A child's first access to everything is through play," she says. "The whole idea of educational game software is to demonstrate that computers, reading and learning are all fun."

DUCKS AHOY,
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$12.95 each, 16K cartridge

MULTI-COLORED PLAYERS

How the pros enhance moving images

by PATRICK BASS, Antic ST Program Editor

Here's an advanced, professional method for creating as many as four multiple-colored players. This tutorial article is designed for advanced assembly language programmers. Included is a short demonstration program written in MAC/65, which should be easy to adapt for the Atari Assembler Editor.

By the time you get to be an intermediate Atari programmer, you are probably aware that one of the most powerful features of Atari computers is Player/Missile graphics for moving pictures around. All Atari 8-bit computer models have four 8-dot-wide "players" each with their own 2-dot-wide "missile".

These can be moved around the screen without disrupting the background "playfield," using a completely electronic means that closely mimics the "chroma-key" process which movie studios use to "paste" a small part of one picture into a larger picture.

But one of the bigger stumbling blocks in this process is the fact that each Player/Missile combination can be assigned only one color at a time. You may choose to have a "multi-colored player" only if you design two or more players to overlap, and set a special bit in the GTIA chip. The trouble here is that the overlapping section of the players cannot be assigned a color of its own, and two or more players are used where one should be enough.

TAKING OVER

However, it is possible to take over the responsibility of coloring the players ourselves—instead of leaving it to the GTIA chip. Then we can design individual Player/Missiles with as many as 256 colors in them, in any order.

This article is now going to describe techniques that go beyond the Atari's normal performance envelope. So please be forewarned that from here on, I am assuming that the reader is a seasoned 8-bit Atari machine language programmer.

A while back, I needed to animate four human figures running across the screen simultaneously. I had to use Player/Missile graphics for the figures, but the players wouldn't look very human if they were each a single color from head to toe.

Interestingly, I got my answer from talking to people who were programming the Atari 2600 Video Cartridge System. You see, the 2600 game machine doesn't have fancy smart chips inside it that know how to draw a TV picture—like the ANTIC or GTIA chips inside Atari computers.

The programmers had to tell the 2600, scan-line by scan-line, what to draw and what to color. Thinking along these lines, I figured that if I told the Atari 8-bit to stuff Player/Missile colors scan-line by scan-line, I might be able to get line-by-line coloring for my players.

continued on next page

THE SOLUTION

Basically, my routine worked out like this. I chose a section of the screen that the players never ventured out of. For this example, let's say the players never get higher than scan-line 32 ($20) and never get lower than scan-line 182 ($B6). We need to take over player coloring control from the computer between scan line 32 and scan line 182. In the Display List for that screen, insert a Display List Interrupt on the scan-line you want to start coloring on. In our example, it's scan-line 32.

When the interrupt (an NMI) happens, you will enter your interrupt routine just as the scan-line is ending. Now for the next 150 scan-lines, perform a WSYNC—stuff player color cycle. The WSYNC will sync you to the start of each scan-line in turn.

When released from WSYNC, increment a scan-line counter. Using the value of the counter as an index into a table of colors, pick up the indexed player color for the new scan-line and stuff the new color into the player color hardware register—NOT the shadow location. When you have reached the scan-line to stop coloring on (in our case, line 182), clean up our mess and return from the interrupt.

Notice that this loop will, quite literally, slave the 6502 processor to the TV scan rate for a short period, and during this time it will not allow any processing of game code to go on. Keep in mind how quickly the computer operates, as compared to how fast the TV is drawing its picture.

However, since the WSYNC will release the processor after the scan-line beam has started its travel from (our) left to right we have time for only three or four LDAs and STAs before the scan-line becomes visible from within the HBLANK interval. Our current demonstration does more work than can be hidden. So a LDA . . . STA process shows up in the Hamburger, whose shape and colors get updated on the left side of the visible screen.

SUBROUTINE THEORY

Player color for each scan-line is in a map that matches the player shape exactly. Since a player shape maps out as a vertical strip of horizontal bytes, if a player shape is ten scan-lines high, then the player color shape should be ten scan-lines high. When the player shape moves one scan-line up or down, move the player color shape one scan-line up or down. In this way, the player's colors will follow the player's shape. The DLI loop transfers the entire player shape strip and color strip from the starting scan-line to the ending scan-line during each displayed frame. As long as the shape and color strip are synchronized, the player remains properly colored.

With this in mind, let's examine the demonstration program. Type in Listing 1 and SAVE a copy before you RUN it. The program is written in 6502 assembly language using the MAC/65 assembler-editor from Optimized Systems Software.

This program will design and bounce four multi-colored players around a video screen. Each player has a different shape and 14 to 16 separate colors. Note that most of the program is just preparation for the main coloring routine. The section that you would include to color your own players is only one subroutine long.

PROGRAM TAKE-APART

Lines 100-2280 contain label definitions and equates. Also in this section are the Display List and portions of reserved memory.

Lines 2300-2640 define two useful macros, a "Load Word" macro and a macro to force the program counter onto the next higher even-page boundary.

Lines 2670-2830 contain the entire section of main run-time code. Notice the short loop in which the section winds up waiting. This would be the area where normal game processing takes place.

Lines 2850-3130 contain the main work of the coloring routine. This code is called from a DLI. You would include a section very much like this one in your own multi-colored player program.

Lines 3160-3560 are called from Vertical Blank. They detour each player to its proper movement routine.

Lines 3590-3810 contain the Vertical Blank Routine. This decides a new direction, moves the player's position there and moves the player image and color.

Lines 3840-4350 contain initialization code. This does things like setting the playfield and initially drawing the players.

Lines 4380-4640 contain each player's color image.

Lines 4670-5260 decide the source and destination of each player image, and then move the images.

Lines 5290-6300 try to move the player in one of four directions. If that direction is not available, the image position is moved back and the direction flag is toggled.

So here's a small package that proves Atari 8-bit computers can have multi-colored Player/Missiles. The concepts here may be a bit advanced. But after all, the capability is already there in the Atari. All you need to do is use it.

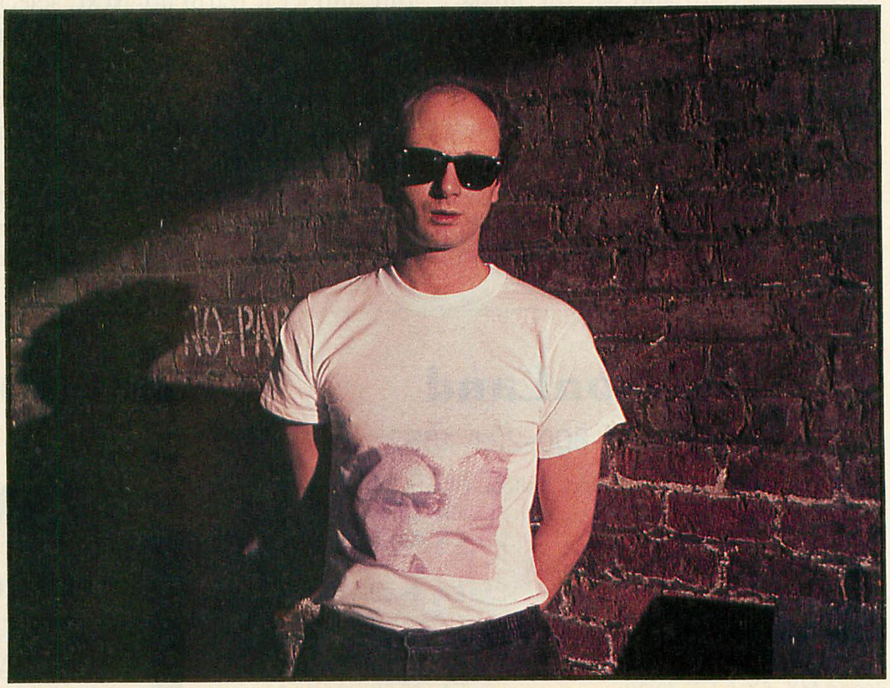
Listing on page 90

T-SHIRT CONSTRUCTION SET

Microscreen iron-ons via Atari

by CHARLES JACKSON, **Antic** Program Editor

Customize T-shirts with your Atari—using your favorite microscreens created with touch tablet or Micro-Painter. This short BASIC program works on Atari 8-bit computers with 32K memory and disk. However, see article for special hardware requirements.



When you want customized T-shirts, you can visit places like Disneyland, 42nd Street or Fisherman's Wharf and search for the ultimate iron-on transfer.

Or, you can sit back and create your own with your Atari.

The T-Shirt Construction Set converts your favorite KoalaPad, Micro-Painter or ComputerEyes microscreens into picture files which you can print out and iron onto your T-shirt.

T-shirt iron-ons are always mirror images of the picture you'll finally get, so you'll have to flip your picture before you print it. The T-Shirt Construction Set is a short BASIC program that loads your favorite microscreen and flips it into a mirror image of the original. The program saves this mirror image as a 62-sector picture file. Now you boot your favorite printer utility and print the picture.

TRANSFER RIBBONS

You'll also need a heat transfer ribbon for your printer. These ribbons use a waxy ink designed to melt off your paper onto your T-shirt, leaving a permanent design.

Heat transfer ribbons are made for most dot-matrix printers—including Epson, Gemini, Star, Okidata, C. Itoh, Prowriter, NEC etc., and are available in many colors. You can buy these ribbons at many computer stores, or you can order them from the manufacturers listed at the end of this article.

Some manufacturers also sell heat transfer pens which you can use for adding more colors to your iron-ons. Just color the paper transfer before you iron it onto your T-shirt.

THE PROGRAM

Type in Listing 1, SOFTWEAR.BAS, check it with TYPO II and SAVE a copy to disk before you RUN it. If you have problems with some of the tougher lines (75, 80, 110, 120 and 5070-5130), don't bother to type them in. Listing 2 will create them for you. When RUN, Listing 2 creates a file called LINES.LST which contains those special lines. Type NEW and then LOAD Listing 1. Next ENTER

continued on next page

"D:LINES.LST" and SAVE the completed program.

The program can manipulate picture files created in either Graphics Mode 7½ (ANTIC mode E) or Graphics Mode 8 (ANTIC mode F). When RUN, the program will ask you to select the graphics mode in which your microscreen was drawn.

Microscreens created with Micro-Painter, Micro Illustrator (on KoalaPad, Atari Touch Tablet, etc.) and Computereyes (Low Contrast and High Contrast modes) use Graphics Mode 7½. Microscreens created with Graphic Master and Computereyes (4-level, 8-level and Normal Capture modes) use Graphics Mode 8.

If you're still not sure which mode to use, try both and use the image which looks best. You can also use Rapid Graphics Converter from the November, 1985 **Antic** to transfer your pictures into a compatible format.

Once the program has created and saved a mirror image of your microscreen, you're ready to turn it into an iron-on transfer. Load your printer with heat transfer ribbon and boot your favorite printer utility. (Jerry Allen's Kwik Dump program from the March, 1985 **Antic**, will produce acceptable results on most printers.)

Be sure to print your picture on *plain, white* computer paper.

IRONING-ON

Ironing on your completed picture can be safe and easy when you observe a few simple guidelines.

Most heat-transfer ribbons work best with T-shirts containing at least 25% polyester. 100% cotton T-shirts do not work well because the ink will wash out.

Set your iron to its lowest temperature and let it warm up. Next, select a suitable T-shirt and spread it out on an ironing board or similar surface. Place a piece of aluminum foil inside the shirt to prevent the ink from bleeding through.

Position the iron-on transfer on your T-shirt (inked side down) and pin it in place. Press your heated iron on one section of the transfer and wait a few seconds. Next, lift the iron from the paper and press it against another section of your transfer. Try not to move the iron when it is pressed against the paper.

Since there are so many varieties of irons, printers and ribbons, you should experiment with different materials and heat settings to find the combination that works best for you.

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Listing on page 88

game of the month

WARRIOR 3000

by KEN GREINER

Would you believe an archery duel for two players, set in a futuristic nine-level arena that features teleporters, power stars and invisible walls? Warrior 3000 provides an interesting blend of fast action and tactical-planning challenges. This BASIC program works on all 8-bit Atari computers with at least 32K memory, disk or cassette.

Futuristic action/strategy challenge

It's about one thousand years in the future and the folks on Warrior 3000 planet tend to get a bit nostalgic about the good old days of single combat. The most popular battle sport they've evolved is the Warrior 3000 Arena—where pairs of brave combatants duel it out in quaintly high-tech archery.

The weapons are energy bows that shoot energy arrows. There are walls and obstacles to hide behind, some of which can be blown up by the energy arrows. The famed Orange-Disk teleporters can instantly whisk cornered combatants out of arrow range.

Hey, it's an exciting life being a Warrior 3000 professional bowman. There are big bucks to be made in the arena—prizes, endorsements, banquet appearances. All you need to do is destroy your opponent in a nine-round competition.

BATTLE RULES

Start your Warrior 3000 career by typing in Listing 1, WARRIOR.BAS. Check it with TYPO II and SAVE a copy before you RUN it. Press [START] to begin the action. Move your fighter with the joystick and fire your energy arrow by pressing the button.

Player one always starts out at the upper left of the screen and displays the remaining amount of fighters and arrows on the left side of the arena. Player two starts at the lower right and has a display on the right side.

Each of the nine rounds takes place in a unique arena set-up. Don't waste all your arrows blowing up walls and obstacles. You get only 20 arrows at the beginning of a round, and after they're all shot off there's nothing you can do but hide.

If both fighters run out of arrows, a power star will appear at a random position somewhere in the arena. The first combatant to touch the power star wins one extra arrow. Remember that you can never destroy your opponent or an obstacle at point-blank range.

Some arena layouts have openings in the side walls that lead into the Mystery Zone. You can fire an arrow out of the opening and it will immediately reappear at the far side of the arena—this is a good way to catch your opponent off-guard. Your player can also enter the opening and instantly re-emerge behind the opponent.

Invisibility becomes a problem during later rounds. You'll hear a beep if you bump into an invisible wall, shooting the wall will make it appear. Invisible teleporters are also encountered in late rounds. They transport a fighter to a random position, just like the regular teleporters (orange disks)—they're simply invisible.

Here's a tip from Grudnik the Great, former Warrior 3000 champ: Practice your diagonal shots. It'll be much harder for your opponent to accurately return your fire at an angle.

Ken Greiner is 16 and attends Paul V. Moore High School in West Monroe, NY. His non-Atari interests include juggling, archery and fantasy role-playing games.

Listing on page 96

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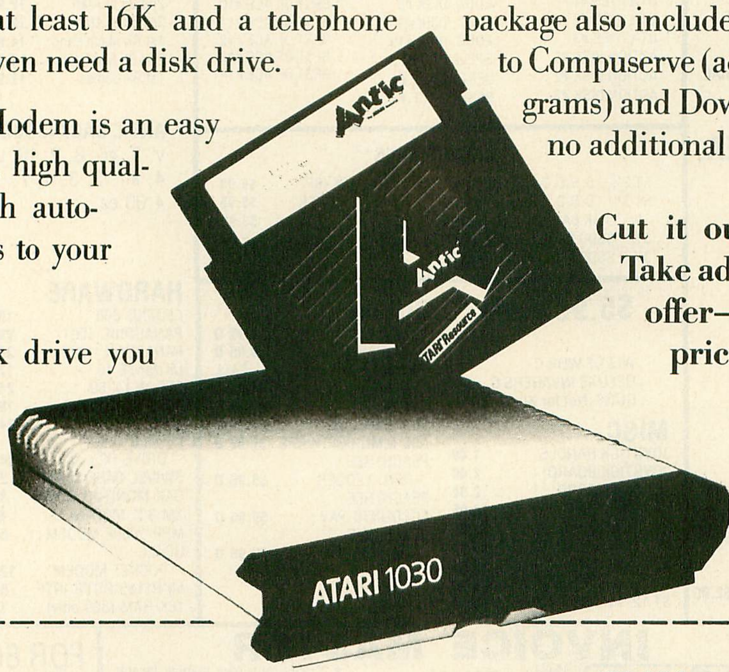

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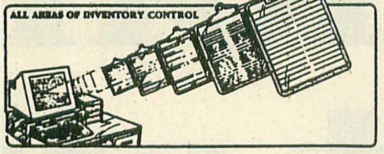

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BASIC ON/OFF SWITCHER

Clean, handy XL/XE BASIC control

by IAN CHADWICK, **Antic** Contributing Editor

Switch disabled BASIC back on from DOS, in convenient and elegant style. This very short BASIC program creates a mini-binary file which, when Loaded from DOS, will turn on the internal BASIC in Atari XL and XE computers.

To disable the BASIC language built into Atari XL and XE computers, you must hold down the [OPTION] key during the first few seconds of a disk boot. This doesn't seem like a terribly difficult task. But sometimes I forget, or I'm too slow getting the key pressed down, or my touch is too light. Whatever. . . I end up in BASIC almost often as not!

Rather than reboot the system, you can disable BASIC with a POKE to 1016, followed by pressing [RESET]. Any non-zero number will do. Once the POKE is set, pressing [RESET] forces a DOS load. If you try to use menu option B, you'll get the No Cartridge message. I think this method is simpler and cleaner than turning the computer off and on again.

A bigger chore is getting BASIC back again after you've disabled it. This isn't just a simple POKE—you can't POKE from DOS anyway. It requires a few extra changes to memory to re-enable the internal BASIC. The solution is in Listing 1.

SWITCHER PROGRAM

To return to BASIC properly, you need to load the BASIC RAM flag at 1016 ($03F8) with zero, the cartridge checksum register at 1003 ($03EB) with 82 ($52), and finally PORTB at 54017 ($D301) with 253 ($FD). PORTB is the memory management location which tells the operating system whether or not BASIC ROM is enabled.

If BIT 1 of PORTB is zero, then BASIC is enabled. End with a jump to the OS warmstart vector at 58484 ($E474). The actual warmstart routine is at 49808 ($C290), but the vector is the proper entry point.

Type in Listing 1. and SAVE a copy before you RUN it. Now RUN the program and go to DOS. Use DOS option K to binary save memory at locations $600 to $612, with a RUN address at $600—don't type the dollar signs. You can name your file anything, I call mine simply GO.EXE. (Antic Disk subscribers will find this listing titled GO.EXE.) Consult your Atari DOS manual if you'd like more details about option K.

Now when you want to return to BASIC, (even if you pressed the [OPTION] key during the boot or POKEd 1016), use the DOS L command to run GO.EXE. It's only one sector long and easily tags onto any file where you might need it.

The nice thing about this method of enabling and disabling BASIC is that it requires no resident routines in memory and it's simple and easy to remember and understand.

Listing on page 95

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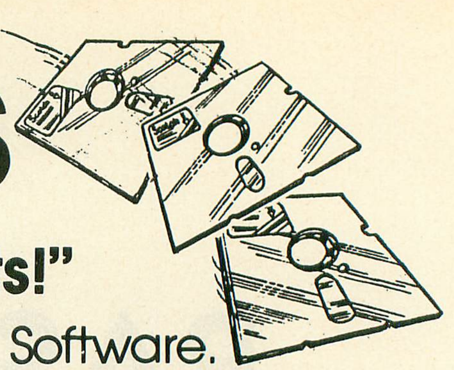

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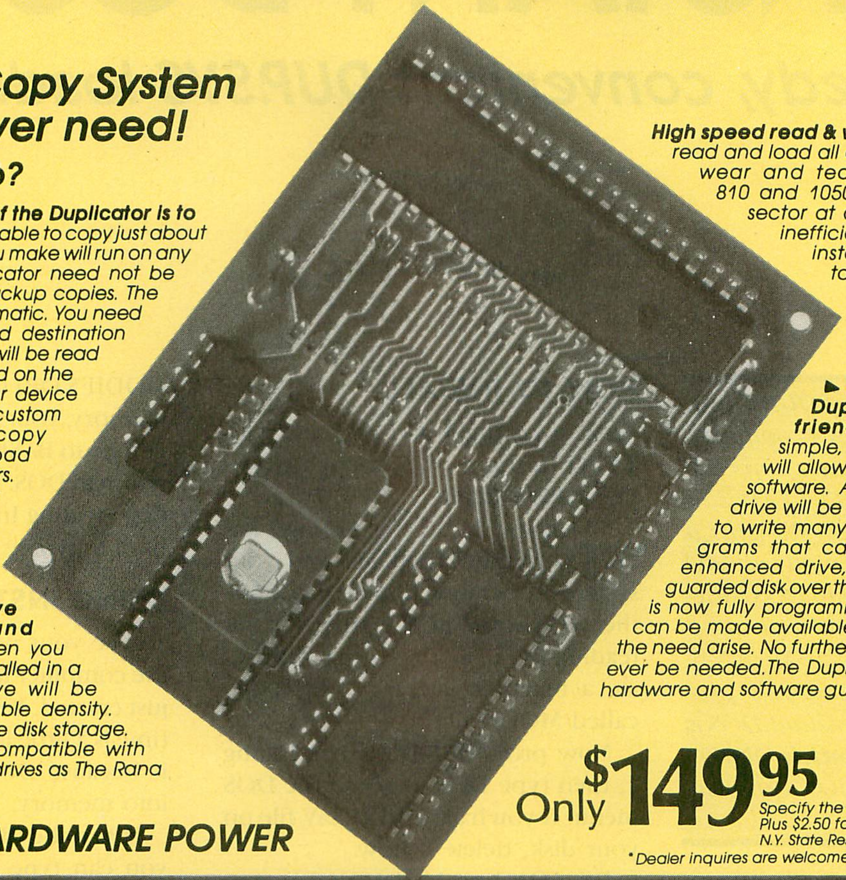

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INSTANT-DOS

Speedy, convenient DUP.SYS loading

by SCOTT FICK

Speed up the loading of DUP.SYS in your 64K-or-more XL/XE computer, with Instant-DOS, a fairly short BASIC modification of Atari DOS 2.5. Instant-DOS stores DUP.SYS plus a MEM.SAV file in the normally unused top 16K of memory. Both DOS functions are rewritten to allow instant loading of DUP.SYS. Also, MEM.SAV is always active to protect your program in RAM. NOTE: Instant-DOS is not *compatible with **Antic's** DISKIO and DISKIO PLUS DOS enhancements.*

If you own an Atari XL or XE computer and use DOS 2.5, you may be getting tired of enduring the long wait for DUP.SYS to load in. The cure for this affliction is Instant-DOS. After you install this modification to DOS 2.5, simply type DOS from BASIC and the DUP.SYS menu is there. Instantly! With the MEM.SAV file included, your resident program is safe in memory when you return.

The BASIC program is relatively short. Once Instant-DOS is installed, you can forget about it. Type the program carefully—particularly the data. And be sure you understand the following instructions before you proceed!

HOW TO INSTALL

Type in Listing 1 and check it with TYPO II, then SAVE a copy or two. Don't RUN it yet!

When you're sure that Listing 1 has been correctly typed in—and your system is operating under DOS 2.5—then LOAD and RUN Listing 1. After reading the data, the listing will create a machine language object file called MODIFY.OBJ.

Now press [BREAK] to halt Listing 1, then type DOS to get to the DOS menu. If you have a MEM.SAV file on your disk, delete it now.

For LOADing MODIFY.OBJ, type [L] [RETURN], then type MODIFY .OBJ [RETURN]. After it has LOADed in, press [RETURN] again to get to the menu. You should see that the second line of the menu has been modified to read I-DOS in inverse letters.

We're almost there. Insert a blank disk and format it with DOS option [I]. When formatting is complete, write your new, modified Instant-DOS to the disk by typing [H] [RETURN], followed by the number of the drive containing the new disk. This disk now contains a working copy of Instant-DOS.

IMPORTANT: Turn off your computer and re-boot your system before proceeding. Because of the way MODIFY.OBJ is currently installed in memory, your computer will crash if you go to BASIC and then attempt to return to DOS. This only occurs when first creating Instant-DOS. You won't have to worry about it in the future.

USING INSTANT-DOS

To use your new Instant-DOS, boot the computer using the disk you have just created. You may notice the boot time is a little longer than usual. This is because DUP.SYS is also loading into memory.

When the READY prompt appears, you can type in a BASIC program, then type DOS and press [RETURN]. The DOS menu will appear instantly.

Check the disk directory and you will find nothing listed but DOS.SYS and DUP.SYS. But MEM.SAV is working. Type B to return to BASIC and you will find your BASIC program is still in memory.

You can make copies of Instant-DOS by using the H option from the Instant-DOS menu. This time around, you won't have to bother re-booting the computer to avoid crashes.

*Scott Fick is from sunny Palm Bay, Florida and Instant-DOS is his first published **Antic** program.*

Listing on page 95

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DOS 2.5 FOR AXLON RAMDISK

Enhanced disk density plus 128K

by PATRICK DELL'ERA

Now, owners of the Axlon RAMdisk and the Atari 800 can take advantage of DOS 2.5 and its enhanced density storage. The following program will create a new RAMDISK.COM file compatible with the Axlon RAMdisk. Requires an Atari 800, Axlon 128K RAMdisk, DOS 2.5 and a 1050 disk drive.

When Atari came out with the vastly improved, and fully compatible, DOS 2.5 that supported enhanced disk density *plus* the Atari 130XE's RAMdisk, I found myself "on the horns of a dilemma."

I didn't want to give up my good ol' Atari 800 with its Axlon 128K RAMdisk board—even though neither of these classic products is still in production. However, I did want to be able to use enhanced density on my 1050 disk drive. Also, the 130XE's bank-selected memory is but 64K, while the Axlon board provides 128K.

What to do? Buy a new computer? Give up that extra RAM? No way! A little programming here, a few fiddled bytes there. . .

I set to work and altered the original RAMDISK.COM so it will allow ATARI DOS 2.5 to handle the Axlon 128K RAMdisk board. (RAMDISK.COM is a file on the original DOS 2.5 disk which, when residing on your boot disk, will create the 130XE RAMdisk).

THE PROGRAM

Listing 1 is a BASIC program that will create a binary file called RAMDISK.COM. Type it in with TYPO II and SAVE a copy before you RUN it.

Now, load Listing 1, place a disk with DOS 2.5 in drive 1, and RUN the program. When finished, the new RAMDISK.COM should reside on your disk.

RAMDISK.COM

On boot-up, DOS 2.5 will look for a file named RAMDISK.COM. If found, it will load and run it before beginning its search for an AUTORUN.SYS file.

Our Axlon RAMDISK.COM checks to find the Axlon 128K RAM board. If found, it checks to see if the board has already been formatted. If not, Axlon RAMDISK.COM initializes DOS to indicate that D:8 is a RAMdisk, the RAMdisk is formatted, DUP.SYS is copied to it, and finally MEM.SAV is written to it.

You now have the same capabilities of the 130XE RAMdisk with one ex-

ception: Instead of 412 sectors free (499 minus what DUP.SYS and MEM.SAV use), you have 710 sectors free! Going to DOS takes only seconds because DUP.SYS is loaded from RAMdisk. When you return from DOS to the cartridge, any program listing will be just as you left it, thanks to the RAMdisk MEM.SAV.

WARNINGS AND CAVEATS

As with any modification, there are a few things to keep in mind:

Axlon RAMDISK.COM *does* change DOS 2.5 in memory. If you then write DOS to a disk, the changes will be written also. To remind you that you are using a modified DOS, the menu of DOS has been changed slightly. The top line is highlighted in inverse characters. The only problem with writing a modified DOS is that the modified version won't work on a 130XE with the original RAMDISK.COM. There are no other problems presently known.

If you find you need to create DOS on a new disk while you have Axlon RAMDISK.COM installed, simply use the copy function to copy DOS.SYS to the new disk. NOTE: You must use a different name than DOS.SYS for the destination. After the DOS.SYS file has been copied, you may then rename it on the new disk to DOS.SYS without any problems.

If you inadvertently delete D8:DUP.SYS, you won't be able to go to DOS unless you first POKE 5439, ASC("1")—assembler users need to alter location $153F to $31—and then put a disk with DUP.SYS into drive 1. Unless MEM.SAV is already on the disk, you will lose any program in memory.

Whenever you go to DOS with D8:MEM.SAV active, DOS will create another MEM.SAV file of as many as 45 sectors. If RAMdisk 8 does not have 45 sectors free, no problem. There is extra space in the Axlon board that DOS can't normally use. MEM.SAV uses this memory for any overflow. If you never call DOS, MEM.SAV will never take any sectors that DOS can address.

Should you inadvertently delete MEM.SAV, you can re-install MEM.SAV by simply saving a file to "D8:MEM.SAV". In BASIC, for example, SAVE "D8:MEM.SAV". Then you can again safely go to DOS without losing anything in memory.

With this new RAMDISK.COM, owners of the Axlon RamDisk board and the classic Atari 800 computer need not feel left out. With 710 disk sectors free, perhaps we can even feel a little smug!

*Machine language maven Patrick Dell'Era last appeared in **Antic** in December 1985 with the spectacular DISKIO Plus.*

Listing on page 94

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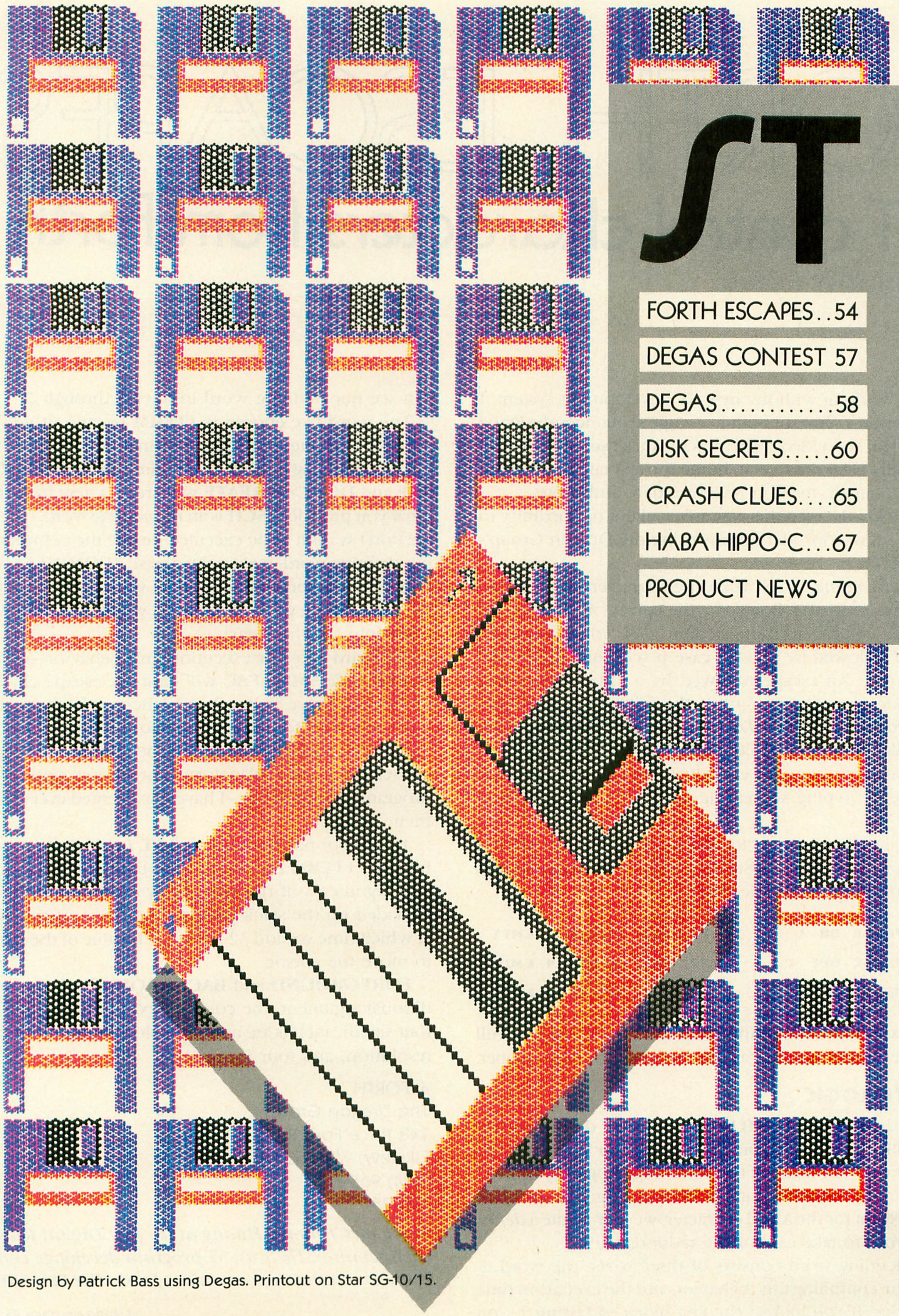
Antic ST Section
February 1986

ST



Design by Patrick Bass using Degas. Printout on Star SG-10/15.

FORTH ESCAPES

ST control characters from Forth

by TIMOTHY HUANG

While working with my new ST development system, I came upon a series of built-in escape sequences designed to control the video display. With these sequences, you can easily clear the screen, home the text cursor, manipulate the cursor, turn on reverse video, and more. . .

I quickly decided this was an excellent opportunity to create a few Forth definitions using the Dragon Group's 4xFORTH.

By generating an ASCII escape character (27 decimal, $1B hexadecimal) followed by the correct ASCII letter or number, you can accomplish quite a lot. For example, an escape followed by a lower-case p will turn on reverse video text. An escape followed by a lower-case q will return to normal text. (*While the following techniques will work from 4xFORTH, we have not been able to get them to work from GEM-controlled LOGO.* – ANTIC ED)

From Forth, you can easily try out a given escape sequence by typing something like: **27 EMIT ASCII p EMIT.**

Or, should you want to add something more permanent to your working system, you can write some simple definitions, and compile them:

```
: REVERSE.ON ( --- )   27 EMIT ASCII p EMIT ;
: REVERSE.OFF ( --- )  27 EMIT ASCII q EMIT ;
: HOME ( --- )         27 EMIT ASCII h EMIT ;
```

However, the above approach does not really take full advantage of Forth. Let's approach this in a logical manner.

FORTH LOGIC

Since the phrase **27 EMIT** exists in every definition, we can follow good Forth practices and *factor* it out as a separate word. The name of this word might logically be **ESC**.

Secondly, since the phrases following the **ESC** are identical except for the ASCII character, we may create a *defining* word to take care of the redundancies.

A defining word consists of three parts: the word itself, the compiling time behavior, and the execution time behavior. If you look at the first block of Listing 1, you can see our defining word in lines 3 through 7.

The word I've chosen is **1TERM** because it will take 1 ASCII character from the terminal.

The compiling time behavior is included between **CREATE** and **DOES>**. **CREATE** will create a new name from what you provide. **ASCII** is an *immediate* word, but since we don't want it to be executed during the compiling of our defining word, we use the phrase: **[COMPILE] ASCII C**. This will defer taking the ASCII value until we actually use the defining word, and then **C** will compile the ASCII value into the dictionary.

The third part—or execution time behavior—consists of **ESC C @ EMIT. ESC** will emit the escape character (as defined above, in line 2). And then we fetch the stored character with **C @** and send it out with **EMIT**.

Blocks 2 and 3 list the ST escape controls. The names chosen are self-explanatory, but—using good Forth programming practice—I have commented every one of them.

The cursor positioning word **AT**, in block 4, is not defined by **1TERM** because it takes two additional values. The arguments of the cursor row and column must be provided on the stack prior to execution of this word, at which time we add 32—the ASCII value of the space—to move the cursor.

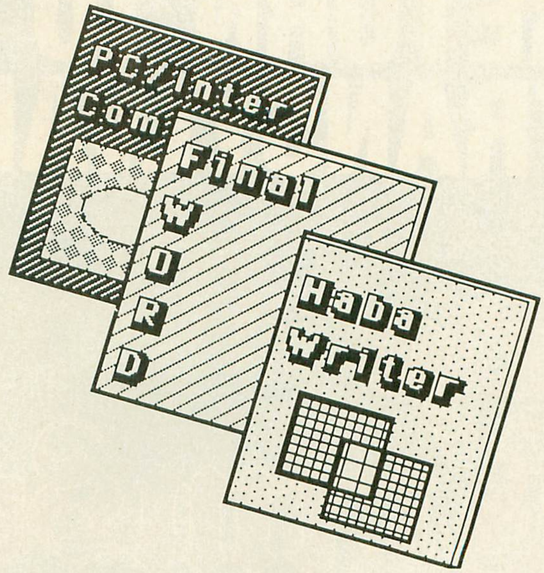
FOREGROUND and **BACKGROUND** take, as an additional argument, the color index. Since only the least four significant bits are used, 16 colors are available in low resolution, and four in medium.

4xFORTH
The Dragon Group
148 Poca Fork Road
Elkview, WV 25071
(304) 965-5517
$99.95

***Antic** met Timothy Huang at the first Digital Research GEM seminar. He is an ST program developer, concentrating on software conversions for the Far East market.*

Listing on page 98

Atari 520 ST
End Users Group, Inc.



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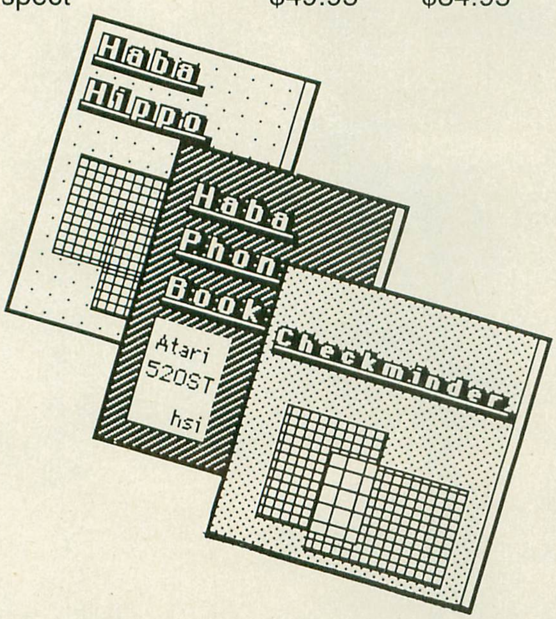

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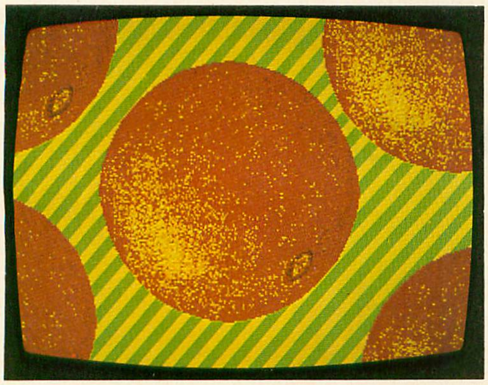
DEGAS $2,000 Art Competition

How you can enter

by GIGI BISSON, **Antic** Assistant Editor

We knew the Atari 520ST had the graphics potential. We knew **Antic** readers had the creative talent. Now, there's a way for *every* ST user to fully tap the ST's artistic promise—**DEGAS**, the powerful paint program from Batteries Included reviewed in this issue.



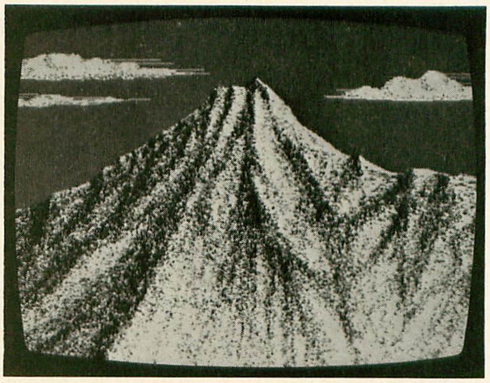
ORANGES by Tom Hudson

And now there's also an incentive—the Batteries Included DEGAS Competition offering $2,000 worth of cash and software.

The prizes are waiting for registered DEGAS owners who can best unlock the technicolor cheeseburgers, floating geometric landscapes and surrealistic portraits waiting somewhere inside the 520ST. . .

YOU COULD WIN

Create a picture using DEGAS and you could win one of two grand prizes—one for the best RGB color entry and the other for the best monochrome graphic. Each grand prize consists of $500 cash, your choice of three ST programs from the Antic Catalog and three more from the Batteries Included Catalog, plus a one-year subscription to **Antic** Magazine.

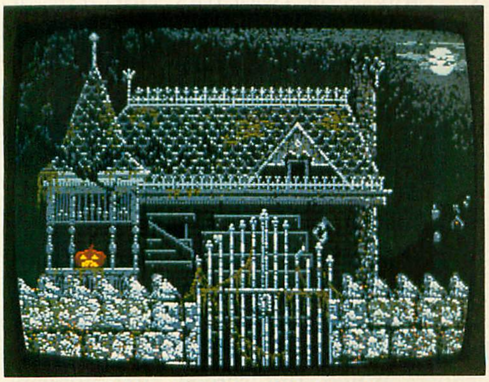


MOUNTAIN by Tom Hudson

The five runner-ups will each win one choice of ST software from the Antic Catalog and one choice from Batteries Included, plus a one-year subscription to **Antic** Magazine.

Batteries Included asked **Antic** to judge their DEGAS Competition because they were impressed with our readers' artwork in past **Antic** graphic competitions (Cover Contest, August 1983 and Utility Man, June 1985).

If Atari owners could turn Utility man into a visual tour de force on an 8-bit computer, what mouse-driven fantasies will ST owners create when they boot up DEGAS and get their hands on the ST's 512 colors and high resolution? We can't wait to find out.



HALLOWEEN by Jack Powell

BASIC RULES

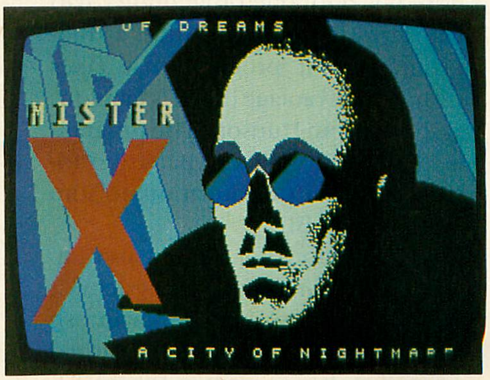
Entrants will be allowed artistic license. But alas, even an art competition must have rules:

1. Your DEGAS picture may be for the Atari ST's RGB color monitor or the high-resolution monochrome monitor. The picture may be of any subject and in any style. But entries must *not* be a copy of any published or copyrighted photograph or illustration.

2. Your picture must be created with DEGAS software—and must be accompanied by the official entry form that you'll find inside the DEGAS package.

3. You can submit only one ST disk per entry form. But your submission disk can include as many as *five* pictures of any graphics resolution.

4. Entries must be received at Antic by midnight, March 31, 1986. The winning pictures will be published in the July, 1986 issue of **Antic**.



MR. X by Dean Motter ©VORTEX

Complete rules for the competition are on the official entry form inside the DEGAS package. If you have further questions, please don't contact **Antic**. Write to Batteries Included at 30 Mural Street, Richmond Hill, Ontario, L4B 1B5, Canada.

DEGAS

Key to ST graphics power

Reviewed by JACK POWELL , **Antic** Associate Editor

I've been meaning to sit down and write this review for weeks now. But everytime I boot the ST, I end up playing with DEGAS. And there goes the time.

At press time, a number of graphics programs for the ST were floating around in various stages of completion, but only one programmer had managed to pull together a full-featured paint program that takes complete advantage the ST's fabulous graphics: Tom Hudson. The program is called DEGAS and Batteries Included has it. Congratulations to Tom Hudson and BI!

DEGAS stands for Design and Entertainment Graphics Arts System. It is no hastily-assembled Macintosh program, ported to the ST and rushed to market. It was written for the ST, designed on the ST, and uses the ST like no program I've seen. And the programming is tight! Most of my time with DEGAS was spent on a late beta version, and I ran into no bugs or glitches. Pretty impressive.

DEGAS is almost completely mouse-controlled. If you're used to a joystick paint program, such as Micro-Painter, you'll be amazed at the speed and convenience of DEGAS. All options are contained on a full-screen menu which you can alternate with the drawing screen by a quick click of the right mouse button. Thus your drawing screen remains completely uncluttered.

The top of the menu contains a line of colored boxes representing your color palette. Since DEGAS works in all three of the ST's resolutions, the palette may contain anywhere from two to 16 colors to choose from. To grab a color, just point your mouse cursor on it and click.

Directly beneath the color boxes is a row of sixteen possible brush shapes which may be selected in the same way as the color bars. Fifteen of the brush shapes are preset but the 16th may be defined by the user and saved to disk.

Most of the menu screen consists of three rows of 13 options, totaling 36 possibilities grouped according to logical categories—each of which is separated by thickened bars. For example, the first six options are drawing styles: Eraser, Draw, Point, Line, K-line, and Rays.

When the screen first appears, Draw is highlighted. Choose your color, click the right mouse button to get to the drawing screen, then hold down the left button and move the mouse to draw a continuous line in whatever brush style you've chosen. A particularly nice feature is the [Undo] key. If you don't like what you just drew, press [Undo] and the mistake vanishes.

Point lets you draw a point everytime you click the button. Line is a "rubber-band" mode. Click on your first point, move the cursor to your next, click again, and a line is drawn between the two points. K-line is similar to Line, except it holds the last point clicked. Rays holds onto the first point clicked and generates each new line from that point.

Further options are Circle, Disk, Frame, and Box. Circle creates an empty circle (or ellipsoid) and Disk creates a filled one. Frame and Box work the same way with rectangles.

38 PATTERNS

There are 38 available fill patterns. The currently selected fill appears in a box on the right side of the menu. To change the current fill, move the cursor to the fill box and click on it. With each click, the next fill pattern will appear until you have cycled through all the patterns.

One of the fill patterns may be user designed. Click on the Make Fill option and a window appears with what looks very much like a character editor grid. From the Make Fill window, you can toggle on or off any of the 16×16 pixels to create your fill pattern. As you draw your pattern, the actual-size fill appears in another window within the Make Fill window.

When completed, you may save this fill to disk for use at any later date. Since loading a new fill pattern will not alter the pattern previously used in your drawing, you can save and load any number of custom patterns and just keep adding them to your picture as you need them. You can also define, save, and load custom brushes. The Make Brush option works very much like Make Fill, except the brush grid is 8×8.

A Slow Draw option alters the ratio of mouse movement to cursor movement and is particularly useful for detailed control or for creating smooth lines.

You can Move blocks of your drawing from one part of the screen to another by grabbing that portion with a "rubber box". Copy portions of your pictures in the same fashion. And there is a particularly useful X-ray Copy which turns the background color transparent. This allows overlay of complex patterns on various parts of the screen.

DEGAS also has Airbrush, Shadow and Mirror modes. All three of these modes may be adjusted. Mirror may be horizontal, vertical, diagonal, or all three. Your Airbrush may be adusted to one of three sizes and intensities. Choose Set Shadow and a window pops up allowing a choice of shadow color, direction of shadow and how many pixels the shadow will be offset!

Shadow works especially well with Text. And here DEGAS really shines. Choose Text, put your cursor anywhere on the screen, and whatever you type appears, starting at the cursor. Now, move the cursor, and the line of text is dragged with it. Click the mouse button when you have it where you want it. In much the same way as Copy, you may choose Block Text or X-ray text.

BUILT-IN FONTS

And DEGAS has fonts! Included with the package is a font editor plus sample fonts which can be loaded from disk. Once loaded, your font appears in a text window on the menu screen. Click on this window to cycle through several sizes of text. Of course, your font does not need to be text. It can consist of custom character shapes. Nicely, none of the text used in the menu is affected by the redesigned font.

We don't have room to describe all the DEGAS options. You can, of course, save and load your pictures to and from disk. In each case, a friendly warning appears to prevent you from annihilating your favorite effort. You may also print a hard copy of your picture, if you have a graphic printer.

One option is not on the menu, though I've probably used it more often than any other. From the drawing menu, press [F1] and a small window will appear. Move the window to any part of your picture and then press the mouse button. The entire screen will become a greatly magnified "fat bit" view of that window. Every pixel is clearly defined and the complete color palette bar is available along the top. From here you can really finetune the details.

But the more gizmos I got, the more I want. So, here are a few features I'd like to see in DEGAS. Some of these are already in the works and will appear in future updates of the package. (Be sure you have an "authentic" version of DEGAS to take advantage of these upgrades.)

I'd like to be able to grab a portion of the picture and then flip, rotate, reverse and inverse that section. I know Tom Hudson plans on including size-change scaling in later versions and I look forward to that.

It would be nice to have a cut-and-paste work screen to transfer parts of two pictures. Currently DEGAS takes advantage of most available RAM in the 520ST. The menu takes up one 32K block, the drawing screen uses another, and the [Undo] key requires an entire screen-sized buffer. Perhaps when GEM is installed in ROM? Or it might be possible to save window-sized portions to disk for later retrieval.

As long as I'm dreaming, how about more than one user-defined Fill or Brush pattern available from the menu. And I might as well add the only real gripe I have about DEGAS: I can't stand having to cycle through all 38 available Fill patterns to get to the one I want. Inevitably, I click right past it and have to click through another 37 to reach it again. Could we have a slide bar?

But, all right, enough Andy Rooneying. The simple fact is: if you want the best graphics package available for the Atari 520ST, get DEGAS. Anyone who owns an ST and has any interest whatsoever in graphics will want this program immediately.

DEGAS
Batteries Included
30 Mural Street
Richmond Hill, Ontario
L4B 1B5, Canada
(416) 881-9941
$39.95

ST DISK SECRETS

Layout of tracks, sectors, files...

by RICK OLIVER, Software Engineer, Hippopotamus Software

Hippopotamus Software visited ***Antic*** *not long ago to demonstrate their new line of ST software. Of particular interest to our programmers was* ***Hippo Disk Utilities****. This program—which is mouse-controlled and completely written under GEM—lets you examine and edit the tracks and sectors of ST disks. You can also restore deleted files, find file information, or search and alter RAM. (Look for a review of this product soon in the ST Section.) We asked Wendell Brown, president of Hippopotamus, if they would share with* ***Antic*** *readers some of the ST disk secrets they had discovered while developing Hippo Disk Utilities. The following is their very generous response.*—ANTIC ED

Before discussing the ST disk operating system (ST DOS), it helps to know how the disk is physically laid out. For now we will limit the discussion to the single-sided, quad-density, 3.5-inch floppy—the type used in the Atari SF354 disk drive.

DISK STRUCTURE

The disk is divided into 80 concentric circles called "tracks", which are numbered from zero at the outside to 79 near the center. Each track is divided into nine "sectors" numbered from one to nine, giving the disk a total of 720 sectors. And each sector can hold 512 bytes of information.

Multiplying this out, we find a total raw storage capacity of 360K on one floppy disk. But as we will see, not all of that space is available to the user for data storage.

Since data on a disk is stored in files, not as tracks or sectors, ST DOS requires some disk space to chart which sectors belong to which files, what the names of the files are, and other file-related information.

Some of this information is stored in the "directory," which occupies seven sectors of the disk. Another part is stored in the "File Allocation Table" (FAT), which is five sectors long.

The FAT contains the information necessary to piece together files, and it is deemed important enough to have two copies stored on the disk. ST DOS also sets aside one sector on each disk, called the "boot record," which has information concerning the format of the disk plus a program to load the system at startup time.

Adding it all up, we see that ST DOS uses up 18 sectors, or 9K, of raw disk space. All remaining space—the data space—is available for user file storage.

CLUSTERS

If a file is written to a newly formatted disk, it will be stored in contiguous sectors. But usually a file is fragmented into different size groups and scattered around the disk to take best advantage of free disk space.

The smallest unit of disk data recognized by ST DOS is called a "cluster". One cluster equals two contiguous sectors.

Thus, the smallest size a file or file fragment can be is one cluster. And since each cluster consists of two 512-byte sectors, any file will use at least one kilobyte of disk space.

THE FAT

The FAT—File Allocation Table—is used to keep track of which clusters belong to which files.

The FAT takes up 5 sectors on the disk, but it is best to look at it as one long string of 12-bit table "entries." Since every byte is 8 bits, this means that every 1 1/2 bytes of the FAT contain an entry.

The first two entries of the FAT, numbered zero and one, identify the format of the disk. The first byte contains the identifying code ($F7 for 80 track, quad-density), and the remaining two bytes are filled with $FF.

Each following entry represents one cluster in the data space of the disk. The first cluster of the actual data space will be numbered two, so that it corresponds to the third FAT entry, also numbered two.

Since each FAT entry is 12 bits, it can have a value from 0 to 4095 ($FFF). If a FAT entry has a value of zero, its corresponding cluster is unused and therefore available to store new data. A value from 4081 to 4087 ($FF1 to $FF7) means the cluster is unusable because of a formatting error. Usually this means that at least one of the sectors in the cluster is physically bad, but it isn't a problem since ST DOS won't try to use that cluster.

If a FAT entry has a value from 4088 to 4095 ($FF8 to $FFF), its corresponding cluster contains the end of a file. Any other value in a FAT entry (2 through 4080, or $FF0) indicates that its corresponding cluster is part of a file.

The way ST DOS sees it, a file is actually a list of clusters in the data space. The first item in this list (the number of the first cluster of the file) is kept in the directory entry for that file. The corresponding FAT entry for the first cluster of the file contains the number of the second cluster. The FAT entry for the second cluster contains the number of the third cluster, and so on until a cluster is reached with a FAT entry between 4088 and 4095 ($FF8 and $FFF). This would be the last cluster of the file.

So the clusters of a file may be anywhere in the disk's data space, and ST DOS just traces its way through the FAT entries to find all of the pieces.

The important part of understanding how it works is in seeing that the data of a file is stored in clusters, that there is a one-to-one mapping between the clusters of a file and the entries in the FAT, and that each FAT entry shows where the NEXT cluster is found.

DISK DIRECTORY

The disk directory is seven sectors long and contains all of the information about a file, except for the information stored in the FAT. Each entry in the directory is 32 bytes long and has eight fields:

Directory Fields

1)	Filename	8 bytes
2)	Filename extension	3 bytes
3)	Attributes	1 byte
4)	Reserved	10 bytes
5)	Time of last change	2 bytes
6)	Date of last change	2 bytes
7)	First cluster	2 bytes
8)	File size	4 bytes

Filename–Contains the name of the file in ASCII text. There is a maximum of eight letters, all of which are stored in upper case. If the name is less than eight characters, the remainder of the field is filled with blanks. A zero in the first byte of the filename indicates that the directory entry has never been used. A value of 229 ($E5) in this byte indicates that the file has been erased. Finally, a period in the first byte of the filename indicates that the entry is actually a special type of subdirectory, as explained below.

Filename Extension–Contains three characters for the filename extension, stored in uppper case. If the extension has less than 3 characters, the remainder of the field is filled with blanks.

File Attribute–This field uses six of the bits in its byte to store certain file attributes (see ATTRIBUTES below). The other two bits are unused.

Reserved–Currently unused and reserved for future use. All bytes in this field are normally set to zero.

Time of Last Change–This field is treated as a 16-bit value divided into three sections. The high five bits are used for the hour (0-23). The middle six bits are used for the minutes (0-59). The low five bits contain seconds in two-second increments (0-29). Multiply the seconds field by two to get the actual number of seconds.

Date of Last Change–Also treated as a 16-bit value which is divided into three parts. The high seven bits are used for the year minus 1980 (add 1980 to the year value to get the correct year). The next four bits are used for the month (1-12). The low five bits are used for the day of month (1-31).

First Cluster–Contains the number of the first cluster of the file. All following clusters in a file are found by tracing through the FAT, as explained above.

File Size–A four-byte (or 32-bit) number containing the size of the file in bytes. The effective size of a file, when read by ST DOS, may be shorter than this if the last cluster is reached in the FAT before this many bytes have been read.

ATTRIBUTES

As mentioned, the third field of the directory is one byte, of which six bits are used as file attribute flags. Currently, many of these attributes seem to be ignored by ST DOS, but the meanings are given here in case they get used by future releases of TOS.

continued on page 63

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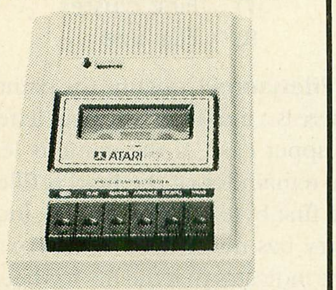

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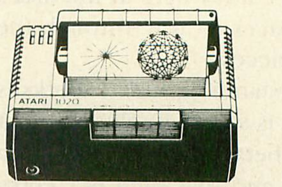

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continued from page 61

File Attributes

Bit	Decimal Value	Hex Value	Meaning
0	1	1	Read Only
1	2	2	Hidden
2	4	4	System
3	8	8	Volume Label
4	16	10	Subdirectory
5	32	20	Archive
6	64	40	Unused
7	128	80	Unused

Read Only–When set, will prevent a file from being deleted or written to. Will not prevent a file from being renamed, however.

Hidden and System–Have basically the same function. They should normally prevent the directory entry from appearing in a directory listing. These attributes are ignored by ST DOS and the Desktop.

Volume Label–Normally located only in the root directory of the directory structure. It marks a directory entry as containing the name of the volume or disk.

Subdirectory–Marks a directory entry as a subdirectory rather than a normal file. A subdirectory is the equivalent of a Desktop folder. Subdirectories are stored in the data space, just like files are. The structure of a subdirectory is the same as that of the main directory (usually called the root directory), except that a subdirectory is not fixed in size. A subdirectory only takes up as much space as it needs, but can grow to whatever size is necessary. There are two special entries in every directory, which act as subdirectories themselves. They are "." and ".."—and they refer to the current directory and the parent directory, respectively. The entry called ".." in the root directory refers to the root directory itself.

Archive–Normally used only with hard disks. It should be set if a file has changed since it was last backed up.

MULTIPLE FORMATS

Until now, we have been assuming a disk format of quad-density, single-sided, 3.5-inch floppy. But ST DOS can actually support a wide variety of formats, in which the number of sides, tracks per side, sectors per track, and bytes per sector may vary. Formats may differ from drive to drive, or even between disks used in the same drive.

The sides of a disk are numbered starting with zero. And disks are not limited to two sides. It is not uncommon for hard disks to have four sides—two platters with two sides each.

Regardless of format, the boot record is located on the first sector of track zero, side zero. It is one sector in length and is usually followed immediately by the FAT, two copies of which are stored in most formats.

The size of the FAT varies with the format of the disk. Directly after the FAT usually comes the directory, whose size also varies with disk format. Following the directory, and continuing to the end of the disk, is the data space which makes up the bulk of the disk.

One other thing that varies with disk format is the size of the entries in the FAT. For floppies, they are commonly 12 bits wide. But hard disks usually have 16-bit FAT entries. Although these entries work in a similar fashion to the 12-bit entries, their values are slightly different.

The first two 16-bit entries are still used to identify the disk format, And a FAT entry with the value zero still means that its cluster is unused and available. But the values for bad clusters on a hard disk become 65521-65527 ($FFF1-$FFF7), and the values for end-of-file become 65528-65535 ($FFF8-$FFFF). Any value from 2 to 65520 ($FFF0) means the corresponding cluster is part of a file, and files are still built in the same way.

CONCLUSION

Armed with a knowledge of the structure of a disk and a program to operate on that structure, it is usually possible to recover recently deleted files or to reconstruct most of a file if one of its sectors has gone bad.

Programs such as Hippo Disk Utilities have functions which automatically recover deleted files, and features that allow direct editing of the entire disk.

However, be careful if you venture into the realm of the disk doctor. It is always a good idea to perform any operations on a *copy* of your disk. That way, even if you destroy the clone, you won't lose the patient.

ST CRASH CLUES

Count the bomb icons

by PATRICK BASS, **Antic** ST Program Editor

The Program Crash. It's something everyone who programs a computer experiences at one time or another. On the Atari 8-bit computers, a system crash is usually accompanied by complete lockup of the machine—not even the reset key works. To recover you need to turn the power off, then back on.

Why did the system crash? Computers have the horrifying habit of doing exactly what you *tell* them, not what you *want* them to do. This can lead the computer to jump into a sequence of unknown instructions, or trap itself in an endless loop.

Each program leaves a trail that can be followed to determine the cause of the crash. Unfortunately, you destroy that trail when you turn off the power. It would be nice to somehow be able to recover that information.

The people who built the "brain" of the 520ST, the Motorola 68000, decided that the MC68000 should be smart enough to determine when a catastrophic crash is about to happen—then try to recover from it, if at all possible.

Events that cause the 68000 to start the recovery sequence are called "exceptions" and the whole ball of wax is known as "exception processing." Events that cause exception processing to occur can range from encountering an illegal instruction, to dividing by zero (since the 68000 has a "divide" instruction).

When an exception occurs, the MC68000 determines what type it is, and uses this as an index into a table of addresses in low memory, which point to routines that handle each exception.

As an example, whenever the machine tries to divide a number by zero, an exception occurs. The 68000 says to itself, "An exception! Trying to divide by zero, eh? Well, instead of trying to do that I shall go down to memory locations $14, $15, $16, and $17 and in there I shall find the address of the routine to perform instead of trying to divide by zero." And the machine jumps to wherever the address at $14(long) points to. Most of the time the program may resume operation. But in some cases this is not possible, and here is where Atari got helpful.

BOMBING OUT

Suppose the 520ST determines that it's about to suffer a bad crash from which it might not be able to recover. Before losing control, it writes a copy of the value in each of its address and data registers to a section in low memory that is *not* erased when you press the [RESET] button in the back of the 520ST.

It then displays the same number of small icons near the center of the screen as the number of the exception that occurred. Have you seen the little "nuclear bombs" (spy bombs in the newest version of TOS) on screen after a crash? Count them, and that's the number of the exception that happened. Reset the machine, and after

continued on next page

ST HELP! AND I/O

Be sure and look in the **Antic** HELP! section for any ST program error corrections. Also, future ST correspondence from readers will appear in **Antic's** I/O BOARD pages.

powerup go down to low memory and look for the crash information in the format that follows:

If the longword at $0380 is $12345678, then the crash information is valid, unless stepped on by another crash.

The Data registers D0-D7 are saved beginning at $0384.

The Address registers A0-A6 and Supervisor A7 are saved beginning at $03A4.

The exception number is stored at $03C4 (long). (See *Figure 1.*)

The user A7 register is stored at location $03C8 (long).

Figure 1

ST EXCEPTIONS

# of Bombs	Exception
2	Bus Error
3	Address Error
4	Illegal Instruction
5	Divide by Zero
6	CHK Instruction
7	TRAPV Instruction
8	Privilege Instruction
9	Trace

Finally, starting at $03CC there are sixteen words pulled from where the Supervisor Stack was pointing.

The information found down in low memory should help greatly in reconstructing why the 520ST crashed. This should, in turn, give a hint as to where in your program the problem occurred.

Program crashes can be useful. I used to get mad whenever a long string of crashes would occur. But I started looking at the problem as if the machine was trying to help, rather than hinder. Indeed, the machine would not crash if I had just given it the correct instructions in the correct order. Every crash should teach you a little bit more about the limits of the machine and the limits of your own programming ability.

For more detail on exception processing, read 68000 ASSEMBLY LANGUAGE PROGRAMMING, by Kane, Hawkins & Leventhal, Osborne/McGraw-Hill, 2600 Tenth Street, Berkeley, CA 94710. $18.95

HABA HIPPO-C

First low-cost ST C language

Reviewed by PATRICK BASS, **Antic** ST Program Editor

A lot of ST Owners have been waiting for this. At $59.95, **Haba Hippo-C** is one of the lowest-priced C packages in the computer industry. A quick survey of C languages for the IBM reveals prices ranging from $200 to $500. And currently the only ST competition is the C in the $300 Development Package from Atari. This makes Haba Hippo-C a pretty attractive buy.

And you get a lot in the package. Besides the compiler and linker, there's a text editor (seldom supplied with most C packages), an assembler, some example programs and an operating system!

Haba Hippo-C is a very good beginner's C. Everything is on one disk and the slim, TV Guide-sized documentation is far from the typical, overwhelming technical documentation found with most C's.

Beginners who pick up a C tutorial from the local computer bookstore will have few problems using Hippo-C to learn standard C. The compiling and linking is fairly straightforward. We only wish the ST development C was this easy!

NO FLOATING POINT

But Haba Hippo-C is a mixed bag. You get a lot for your money, but you also get what you pay for. For one thing, Haba Hippo-C has no floating point capabilities. Beginners might be able to live with this for awhile, but experienced C programmers will quickly throw up their hands.

The documentation, while clear and friendly, is mercilessly brief. The supported GEM VDI and AES calls are listed, but no explanation is made about how to use them. The same is true of the BIOS and BDOS routines.

Instead, the back of the manual suggests that you may obtain the ST Developer's Package from Atari for information on AES and VDI. But presumably Hippo-C is purchased for its low price. After buying the Developer's Package—which includes a *full* implementation of C—who is going to continue using a subset such as Hippo-C?

Most of the VDI calls are included in this implementation, but some AES calls appear to be missing. I say "appear" because some of the calls have been *re-named*. Then again, since there is no real documentation on the Hippo-C calls, we're not sure what they do. They may be brand new.

Again, we're in the same boat with the BIOS and BDOS routines. It's hard to tell which are missing or renamed since practically all of them have been altered.

Extended BIOS routines are missing altogether. If you really know your stuff, you can write your own routines. But those who can do this will probably want a more powerful implementation of C.

UNIX

C was originally developed in the late 1960s by Brian Kernighan and Dennis Ritchie for use with the UNIX operating system—a text-command, shell-oriented system with "tree-file" structures. The developers at Hippopota-

continued on next page

mus have decided to maintain this *UNIX structure* for Haba Hippo-C and have included a subset of UNIX with their package called HOS (Hippo Operating System).

The decision to stay with the UNIX structure was prompted, no doubt, by a desire to transfer Hippo-C to the ST as quickly as possible. But we think it is a major mistake. It's wonderful to get a completely new operating system thrown in with a $59.95 C package. But a UNIX-based C causes problems for a computer based on CP/M-68K, such as the 520ST.

The incompatibilities begin with the Haba Hippo editor. It will not properly accept straight ASCII files written by other ST editors. The problem seems to be that it uses line-feeds instead of carriage returns. And, of course, you cannot SHOW a text file from the Desktop if it has been written with this editor.

More importantly, end-programs written in Haba Hippo-C must be run from either the GEM desktop or from HOS, but they cannot be run from TOS.

GEM COLOR CASCADE

Let's look at what happened when we tried *running* **Antic's** first published C program, GEM Color Cascade (October 1985).

We figured this was a short and simple program that should cause no problems. Wrong. First, the editor would not accept our source code file, since it was written with the Mince editor. So we re-typed the whole program only to have the compiler spit it back because we were using floating point and attempting to access XBIOS for random numbers.

COMPILER

The C compiler supplied with the package is a subset of standard Kernighan and Ritchie C. Data types include char, unsigned char, short int, unsigned short int, int, unsigned int and pointer. Hippo-C uses all standard unary, arithmetic, bitwise, assignment and logical operators.

As mentioned, Haba Hippo-C does not support floating point. Nor is it able to pass or receive structures from procedures.

ASSEMBLER

The MC68000 assembler that comes with Haba Hippo-C is primarily included to assemble source code generated by the compiler. But it can be used for directly assembling code written by the editor.

The assembler supports full Motorola opcode mnemonics and all of the 68000's addressing modes. It will accept ten directives: .byte, .word, .long, .ascii, .even, .text, .data, .bss, .space(n), and .global. Only two expressions are legal: "label+n", and "label+-n". Seasoned assembly language programmers will find this limiting.

LINKER

The linker has the job of combining object modules (the .o files) produced by the assembler into one executable object code file called "a.out". This again is UNIX standard. You can choose either to link your program to run from HOS, which is default, or from the GEM desktop.

A maximum of 50 files may be linked together and you may link to files on other disks by preceding the filename with the proper disk drive specification.

BATCH FILES

Batch files are supported by HOS. These files contain sequences of instructions that are commonly typed by the user to perform some task. By using batch files, the user can direct the computer from a series of instructions within a file and avoid typing the same instruction list over and over.

HOS batch files may be passed as many as ten arguments, labeled from $0 to $9. For example, If we had a batch file set up for compiling a program, we could pass the program name to the batch file by typing the batch function name, a space, and then the filename. In the batch file, wherever the $0 appears, it will be replaced by the filename.

FREEBIES

Haba supplies eight sample programs on the disk. These are simple programs, but they do show the basics of getting a program up and running. User may edit these files as they like, and use them as the base for their own programs.

Unfortunately, no description or analysis of the programs is in the documentation, and the source code comments are skimpy at best. While they are short and basic, beginners might like some explanations. And these are the only examples of GEM programming in Hippo-C.

COMPARISONS

When an actual comparison between Haba Hippo-C and Digital Research's Alcyon C is made, some things stand out. For example, Hippo-C can compile, assemble and link a given program in half the time of Alcyon C. But the final Alcyon program will run roughly twice as fast.

And Hippo-C is more convenient. When errors during compilation are encountered, the editor may be re-entered quickly, rather than having to swap disks as with the Digital C.

WRAP-UP

Overall, Haba Hippo-C is a good package for a newcomer to C programming, but it may be weak for the seasoned C'er. For the price, an editor, a C compiler, a 68000 assembler and a linker are a very good buy. At this time, Hippo-C is one of only two available C languages for the ST. We expect this to change, but we do not expect a full implementation of C to reach the market at anywhere near $59.95.

The final verdict? It's up to you. If you would like to learn C, this could be the package for you. However, if you've tasted a full implementation of C elsewhere, you may feel constrained by Haba Hippo-C.

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ST PRODUCT NEWS

ST reviews

HIPPO ALMANAC
Hippopotamus Software, Inc.
985 University Avenue, Suite 12
Los Gatos, CA 95030
(408) 395-3190
$34.95

Reviewed by Gil Merciez

"Good Afternoon, today is May 29, 1985. On this day in 1736: Patrick Henry, orator and statesman, was born . . ."

Thus begins an entertaining and absorbing journey into the **Hippo Computer Almanac**. Packed onto one small 3 ½ inch ST disk are more facts, figures and trivial oddities than even your Aunt Betty claims to know.

Hippo Computer Almanac is not as all-encompassing as its 1,000-page pulp counterparts found on newstands and in bookstores. But its ease of use and variety of subjects make it a delight to use. It is the type of program that was never possible on the 8-bit Atari with its smaller disk capacity.

Using the kind of artificial intelligence *techniques* popularized by today's adventure games, requesting information from the Hippo Almanac is a snap. Type your question in plain English, and out pops the answer. What is the population of Egypt? 47,684,160.

Straying beyond the capabilities of Hippo Almanac's vocabulary parser or knowledge database produces appropriate responses such as "That doesn't make sense to me," or "I don't know."

Occasionally Hippo Alamanac will get confused about what you are trying to ask. Requesting the number of calories in a piece of bread not only produces the caloric content of 9 different types of bread, but also of bread pudding and raw-cut asparagus pieces.

Strange responses, however, are half the fun. It was a great mental exercise just trying to figure out how Hippo Almanac arrived at some of its answers.

Hippo Almanac knows about all the States of the Union, countries of the world, and most major cities in regards to size, population and location. It can tell you key information about the planets of the solar system.

In the trivia department, you can find out who won the Nobel Prize for any year in any category. The identities of Academy Award winners in the four major categories are yours for the asking. Find out what important (or not so important) event happened on any day over the past 2,000 years. Learn how to say "hello" and other basic words in 34 languages.

Sports buffs can delight in statistics on past Super Bowls, World Series, basketball, or Olympic (summer and winter) championships.

Written documentation for the program is minimal because help is available either from the pull down Options Menu or by typing HELP from the keyboard. Using a series of nested menus, Hippo Computer Almanac provides all the documentation that is necessary within the program.

Many questions given Hippo Almanac require knowledge of the current time, date, or geographical location. For example, you may want to know how far it is to Paris, or what time it is in Moscow.

When the program is booted you are prompted to update your location to the city nearest to where you live. Failure to do this will place you in Los Gatos, CA, home of Hippopotamus Software.

One feature that I found lacking was the spelling dictionary. It contains only some 275 words, hardly enough to be useful.

Response time for answers varied,

depending on how much skipping between categories you do. Due to the fast access of the ST drives, however, it was always quite acceptable.

A nice feature of Hippo Almanac is its expandability. Using the Remember and Forget commands, you can add or delete any information that you desire. The program will key to any word that you have entered for later retrieval. Add birthdays, telephone numbers, addresses, or anything you want to save for posterity.

However, as the program is copy protected, I always feel a bit uneasy writing to a disk that I can't back up. Hopefully Hippopotamus will reconsider their copy protection policy to allow some way to back up the disk.

Hippo Computer Almanac is a unique application for the Atari ST and can provide hours of enjoyment exploring its secrets, either by yourself or in a group setting. You might even learn something.

SOFT SPOOL
Michtron
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700
$39.95

Reviewed by Brad Kershaw

Soft Spool is a useful printer buffer program for people who expect to do a lot of writing or spreadsheet work on the ST. You can print long, multi-page documents and while your printer is merrily printing away, you may continue with your program—or switch over to a game.

If you are a professional writer or business person, this program is a must. You can avoid wasting precious time standing around waiting for the printer to finish. Soft Spool shows off the real capabilities of the Atari 520ST.

To operate Soft Spool, click on SPOOL.TOS from the GEM desktop. The program will automatically determine how much memory is available for the print spooler. This is partly limited by how many desk accessories you have active. A standard 520ST with no accessories will give you 110K of available spooler RAM. You may also choose how much memory you want to allocate to the spooler in 1K blocks.

Once you have indicated the amount of memory, you can run a program or print documents as you normally would. I took a 9K document and told the computer to print it 10 times. My printer jumped into action. I then played a game, formatted a disk and wrote a letter. And my printer never stopped.

Although the computer was switching between two tasks—playing the game, printing the document, playing the game, etc.—there was no noticeable speed reduction of either task.

There were also no detectable incompatabilities. I could find no program that interfered with the spooler, and the Soft Spool caused no problems with programs I ran.

Should you want to halt the printing of a long document, all you have to do is rerun the program. It will tell you that there is a document being printed and ask if you wish to cancel it. Say yes, and the printing will stop immediately.

Soft Spool is invaluable. Now, you can now use a letter-quality or a slow dot-matrix printer and still have time left over to get some work (or play) done.

PC/INTERCOMM
Mark of the Unicorn, Inc.
222 Third Street
Cambridge, MA 02142
(617) 576-2760
$124

Reviewed by Charles Jackson

PC/InterComm is Mark of the Unicorn's deluxe, feature-laden, "no-holds barred", top-of-the-line telecommunications program. This menu-driven program offers a spectacular array of bells and whistles. But, at $124, you'll be paying a pretty steep price to ring those bells or blow those whistles.

PC/InterComm can emulate either a VT100 or a VT52 terminal. It supports more than a dozen transmission speeds (from 50 to 19,200 baud) and includes many commonly-used file transfer protocols such as Modem7 (XMODEM), Kermit, "Raw" and ASCII-mode.

For quick and easy dialing, PC/InterComm includes a single-number phone directory, accessible through the Modem Control sub-menu. You can set PC/InterComm to dial this number as soon as you boot the program.

You may also redefine the ten function and shift-function keys to hold twenty more phone numbers, but this is an undocumented feature. For example, you could redefine the [F1] key with the string: ATDT9564281. Once defined, press [F1] and [RETURN] to dial the number.

PC/InterComm is packed with many important features normally found in expensive modem programs. These niceties include a margin bell which can either be turned on or off, two types of cursors (blinking or non-blinking), selectable screen colors (black or white), optional word-wrap and the ability to select which RS-232 serial I/O port to be used. (As of this writing, the Atari 520ST comes with only one such port, labeled Modem.)

In all, PC/InterComm offers nine sub-menus and more than four dozen different menu selections. Eleven of these functions may also be accessed directly with the [Alternate] key and a letter key.

PC/InterComm comes with 135 pages of comprehensive, indexed documentation. Each menu option is carefully explained, and the appendices include a ten-page troubleshooting guide, a technical description of an RS-232 interface, ASCII and control code charts, schematics for constructing a null-modem cable (necessary for transferring files between computers without a modem) and a fifteen-word glossary.

The program is so friendly, though, that this impressive documentation is usually unnecessary. Just press [HELP] to jump to the program's main menu. Should you need help with any of the menu options, press the [?] key for an instant, onscreen explanation of that option.

Let's try a sample session. We'll use PC/InterComm to log onto an ST BBS,

continued on next page

download a file, and return to the desktop.

From the GEM desktop, double-click on IC.PRG. After the program begins, press **HELP** to get to the main menu.

Step through the nine sub-menus and configure your terminal. You'll want to set such items as baud rate, parity, screen color (black or white), and the phone number to dial. Once you're satisfied with the configuration, you should save it to disk with menu option 7 (Other Functions), sub-choice 4 (Save Setup). You may save as many terminal configurations as your disk will hold.

If you have a Hayes-compatible modem, you can dial the phone from option 6 (Modem Control), sub-choice 1 (Dial Phone). Otherwise, you can use standard ATD commands to dial the phone. Use one of these methods to dial the BBS.

Log onto the BBS, and find the Files For Downloading section. Select a file for downloading by XMODEM protocol and tell the BBS system to begin sending.

Press the [HELP] key to obtain PC/InterComm's main menu, and select item 5 (File Functions), sub-choice 2 (Receive A File). Then, type in a destination filename and press [RETURN] to begin the transfer.

When you're through transferring files, exit from the BBS and press the [UNDO] key to return to the GEM Desktop.

PC/InterComm is compatible with CompuServe, Delphi, many mainframe systems, and virtually any ST BBS. But, for all its extras, PC/InterComm is not particularly useful when porting files to and from 8-bit Ataris, or for downloading and uploading files to an 8-bit BBS.

The problem lies with the relative slowness of disk drives for the 8-bit computers. Even when PC/InterComm's variable I/O delay rates are set to their maximum values, PC/InterComm will "time out" and abort the transfer while waiting for the 8-bit drive to catch up. Owing to the sluggishness of these drives, it's nearly impossible to port large files to and from conventional 8-bit systems with PC/InterComm.

Overall, PC/InterComm is an excellent product that may be missing its market. At $124, the package offers high quality and comes in an attractive IBM-box-and-binder, but its unique features are likely to be considered unnecessary by most ST owners.

With the popularity of XMODEM protocol on the ST, Kermit protocol isn't really needed to port files between Ataris. Furthermore, PC/InterComm's insufficient delay rates make it practically impossible to transfer long files to or from 8-bit systems.

Finally, superior implementations of XMODEM protocol can easily be found on ST programs selling for one-tenth the price of PC/InterComm.

MUDPIES
FLIP SIDE
MichTron
576 South Telegraph
Pontiac, MI 48053
(313) 334-5700

Reviewed by Eric Clausen

Flip Side ($34.95) and **Mudpies** ($39.95) are two of the first games available for the Atari ST. One of them I liked a lot. . .

FLIP SIDE

Flip Side is an ST version of the familiar Othello game. Refreshingly, this implementation makes full use of the mouse and the drop-down GEM windows for controlling virtually every portion of the game.

From the "Players" drop-down, you can select One Player, Two Players, No Players (machine plays both sides), Select White or Black, White Moves First, Black Moves First or Random Moves First (for machine playing both sides).

Within the "Options" drop-down, you may select Suggest Move, Show Possible Moves, Switch Pieces, Edit Board, New Board and Quit. These should be self explanatory to anyone familiar with board game simulations.

Skill levels from 1 to 6 are also available—and the response time of the computer is quick, even at the hardest level.

An interesting feature is that you can, at any move, change the skill level to High, go to Suggest Move and find out what to do, then change the skill level to Low before making your move. The computer will then take its move at a lower level. Beginners will benefit from using this feature as a tutorial. (Some might call it cheating!)

A timed move function is also provided. Your move must be made within the pre-set time (up to 9:59) or you will forfeit your turn. Default time is set at 2:00. When this option is invoked, you will see a countdown timer, reminding you of your remaining time.

Flipside plays a formidable game. It beat me most of the time, at the lowest skill levels. And I've been playing Othello for several years.

MUDPIES

The setting for MUDPIES is a circus where your character is a mischievious little devil throwing deadly mudpies at the clowns and killing them. You actually get points for doing this. Naturally, the clowns don't like your little diversion and are out to get you. They throw things back at you, which you must dodge—or die.

In keeping with this light, carnival atmosphere, your character must also eat junk food in order to sustain his mud-slinging energy. He must pick up just enough—but not too much of these goodies to keep him going on his never-ending quest for higher levels of slinging.

Each screen is thoughtfully littered with little boxes of fries, shakes and hamburgers. The programmers have made excellent use of the 320×200 ST graphics to show us the "Golden Arches" on the fries. Yum.

The plot here is basically that you play until you die, meanwhile progressing through as many rooms as possible, gathering as many points as possible.

Visually, the game is interesting. And the music entertainingly relates to the theme, but it takes no advantage of the ST's wave-form envelopes and, frankly, sounds worse than many 8-bit Atari games.

You may play a one or two player game—using mice or standard Atari

joysticks. But, unless you're interested in a very short game, use joysticks. Mouse control of the character is imprecise and extremely difficult.

Very young children should find the color and the clowns in Mudpies fascinating. Unless their coordination is above average, however, they might quickly become frustrated playing the game. Older children and adults will probably have no interest in the game to begin with.

Mudpies essentially takes no advantage of the power of the ST. In fact, were it released for the 8-bit Atari, I'd be disappointed. It looks very much like a game designed for an 8-bit that was quickly transfered to the 68000 machine to reach a software-starved market.

Based upon MichTron's other release, Flipside, however, we should be encouraged. That is entertainment which makes use of the computer's unique abilities while offering variety and clean graphics. I look forward to seeing more software from MichTron.

New Products

Spinnaker Software is releasing many of their most popular software titles for the ST. **Treasure Island** and **The Wizard of Oz** will be two from their Windham Classics. Under the Telarium line will be **Fahrenheit 451**, **Perry Mason**, **Amazon**, **Dragonworld**, and **Nine Princes in Amber**. All of the preceeding titles are graphic adventures with a suggested retail price of $44.95. Spinnaker also announced two ST educational products: **Homework Helper Math Problems** and **Homework Helper Word Problems** ($49.95 each).

Spinnaker Software, One Kendall Square, Cambridge, MA 02139. (617) 494-1200. PRESS.

Optimized Systems Software throws their quality hat into the ST ring with **Personal DiskKit** ($39.95), which lets you examine, repair and modify ST disks. The program will be completely integrated in the GEM Desktop environment and O.S.S. is including the full source code plus documentation on the disk! O.S.S. will also be supplying the ST with a range of languages beginning with **Personal Pascal** ($89.95). This will include compiler, editor, linker, libraries and, no doubt, O.S.S.'s famous customer support.

Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA 95129. (408) 446-3099. PRESS.

Yet more software is flowing from the electronic cornucopia of Hippopotamus Software. Their latest releases are: **HippoSimple** ($49.95), an easy-to-use home database; **HippoBackgammon** ($39.95), multi-level tournament Backgammon with full-color animated graphics; and **HippoArt I** ($39.95), a collection of over 30 color "click-art" pictures which can be edited and combined for creative montages.

Hippopotamus Software, Inc., 985 University Avenue, Suite 12, Los Gatos, CA 95030. (408) 395-3190. BETA & FINAL.

Activision will adapt its new illustrated text adventure, **Borrowed Time** ($49.94) for the ST. This is Activision's entry into the hard-boiled private-eye field. They are also releasing ST versions of their popular **Hacker** ($44.95) and **Mindshadow** (no price at press time).

Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043. (415) 960-0410. PRESS.

For those interested in serious business applications, Oxxi is offering a relational database called **db One** ($99.95), which includes mailing list, labeling, checkbook setup, inventory, and more. Oxxi is also releasing **WordWhiz** ($59), described as a quick and efficient word processing program with simultaneous access to more than one document.

Oxxi, Inc., 3428 Falcon Avenue, Long Beach, CA 90807. (800) 453-4900. PRESS.

Regent Word ($49.95), according to Regent Software, is the "first full function word processor for the Atari ST." Features include complete function key use, print preview showing underline, bold, and elongated text, and a text telecommunications mode to download documents.

Regent Software, 7131 Owensmouth, Suite 45A, Canoga Park, CA 91303. (818) 883-0951. FINAL.

Mirage Concepts announced **Atari ST Toolbox—Volume One** ($39.95), which will include five separate programs: a disk sector editor, memory editor, fast formatter and copier, file recovery program, and directory printer.

Mirage Concepts, 4055 W. Shaw Avenue, #108, Fresno, CA 93711. (209) 227-8369. PRESS.

Electro Calender ($39.95) will organize your life. You can display or print a picture of any month from 1776 to 3001. Additional features include a message scan and appointment search to simplify your future.

Soft Logik Corp., 4129 Old Baumgartner, St. Louis, MO 63129. (314) 894-8608. PRESS.

And now you can get on-line with **ST-Term** ($39.95), the data communications program from Comnet Systems. This smart terminal emulator includes such features as a connect timer/billing calculator, twenty definable macros, 400-entry phone directory, AMODEM, Kermit and more.

Comnet Systems, 7348 Green Oak Terrace, Lanham, MD 20706. (301) 552-2517. FINAL.

FinalWord ($145) is a top-of-the-line word processor from Mark of the Unicorn which features split-screen editing, footnoting, table of contents and index entries, and automatic back-up.

Mark of the Unicorn, 222 Third Street, Cambridge, MA 02142. (617) 576-2760. PRESS.

New ST product notices are compiled from information provided by the products' manufacturers. ***Antic*** *assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time,* ***Antic*** *had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

product reviews

ICEPIC Interface

Integrated Computer
Equipment Co.
8507 Natural Bridge Road
St. Louis, MO 63121
(314) 423-3390
$49.95, 16K disk

Reviewed by Eric Clausen

Just when I thought I'd seen every boring plug and cable ever made for the Atari, along came the **ICEPIC** printer interface and I was pleasantly surprised to get my hands on something quite out of the ordinary.

Although many Atarians will find the ICEPIC uniquely intriguing and useful, I don't want to give the impression that this is the interface for everyone. If you are looking for your very first interface, you could find one that's easier to use. For instance, you must use the ICEPIC software in order to make the interface box work. On the other hand, I don't know of any other interface that offers so much versatility in controlling your actual print formats.

The ICEPIC hardware is an extremely compact box with a cable that plugs into any Atari joystick port. The ICEPIC provides graphics support for Epson or Okidata printers and compatibles. However, any Centronics parallel printer will function in text mode with the ICEPIC.

The ICEPIC "pre-boot" software includes various drivers and is supplied on a single-density disk without DOS. Before proceeding, you must make a backup of the disk, with a DOS added, and name it AUTORUN.SYS. If you attempt to boot the master disk you will receive nothing but a BOOT ERROR message!

A configuration file will guide you in customizing ICEPIC drivers for various applications. "Canned" configurations are already provided for some of the more common applications—including files for use with BASIC programs, Atariwriter, B/Graph, KoalaPad and Atari Touch Tablet (for screen dumps), Printshop and Paper Clip. Other applications will require that you experiment a bit, although the process is not difficult.

If you are really interested in getting the most out of your printer, the ICEPIC is capable of producing virtually every type of effect your hardware can handle. An exhaustive list of ICEPIC printer functions would be spectacularly long and would include—but not be limited to—the following: print line, hardcopy toggle, form-feed control and screen text dump, font selection, graphic screen dumps, screen dumps to disk, compressed or expanded print, double-high print, characters facing up or down or left or right, underscoring, shaded graphic dumps, margin setting . . . plus much more.

Most of these effects can be produced with other interfaces—if you are able to locate and purchase the proper software. But the cost of this software alone could easily come to more than the $49.95 price of the ICEPIC. In other words, even if you already own another interface, you might be better off buying an ICEPIC instead of paying for additional printer utility programs!

Another interesting feature of the ICEPIC is its ability to simultaneously dump to printer what comes in on your modem. ICEPIC can do this while you're online because it doesn't share the SIO with the modem. This particular application might be a bit hard on your printer and could be best suited to those with large printer buffers, but it is possible.

The ICEPIC comes with an interesting tutorial that demonstrates some of the interface's many capabilities. The manual is well written and should be adequate for most needs. If some problem or question should arise, the people at I.C.E. have proven themselves very helpful on the phone.

If you already own another interface and a few printer graphics utilities, you're about the only kind of Atari user who should not consider buying the ICEPIC. Even if you never need anything but straight text output, you might still want the ICEPIC for its price alone.

COMPUTER PRINTER COMMANDS

(book)
Cardinal Point, Inc.
P.O. Box 596
Ellettsville, IN 47429
(812) 876-7811
$39.95

Reviewed by Eric Clausen

The **Programmer's Handbook of Computer Printer Commands** is a 270-page compilation of printer control codes for over 170 dot-matrix and daisy-wheel printers. It covers printers from 43 different companies—and models as recent as 1984.

A printer reference text? It's surprising that nobody ever thought of compiling a reference like this before.

In many cases, this book presents information more clearly than the original owners manuals! The Handbook is thoughtfully and carefully arranged—first alphabetically by manufacturer, then numerically by printer model. Each individual printer entry lists the keys to implement a particular function, as well their hexadecimal and decimal equivalents, plus a description of each function.

Those most likely to find this book highly useful are programmers who require information on a wide vari-

ety of printers in order to program printer drivers or develop screen dumps. Perhaps if more programmers had access to a reference manual like this, there would be fewer commercial programs compatible with only a limited number of printers.

Workers who deal with a lot of different printers in the same office (such as **Antic** employees) may also find this reference invaluable.

Even the "average user" could benefit. For example, the PaperClip word processor provides a printer driver builder. If you needed to use your PaperClip with many different printers, you could find all of the information necessary to construct the correct drivers in this one book. This would eliminate the need to search for—and decipher—many owners manuals.

Several very new models unfortunately are not included in the book. However, registered owners are entitled to receive corrections and information from the next edition now being prepared. The 1985 edition will cover printers through 1985 and will include information on inkjet and color models.

The book also includes both addresses and phone numbers of all manufacturers covered. So specialized questions concerning any printer may be directed straight to the proper source.

My only complaint is that this softbound book is just too expensive for many potential buyers. At $37.95 plus $2 for shipping, I think the Handbook costs more than the average person can afford. Perhaps the publishers will reconsider their pricing with the next edition.

I look forward to seeing the updated version of the Programmers' Handbook of Computer Printer Commands and I wish this project much success. If you work with printers a great deal, this valuable reference work could save you a vast amount of time and trouble.

MICRONET

Supra Corp.
1133 Commercial Way
Albany, OR 97321
(503) 967-9075
$199.95

Reviewed by Charles Cherry

Networks are clusters of microcomputers that share both software and peripherals. If you've been waiting for an Atari network that will allow your computers to share data and communicate with each other, then you'll have to keep waiting.

Although **MicroNet** is not a "true" timeshare network, it might well produce substantial savings in classrooms or small offices. This product allows up to eight Atari 8-bit computers (any 400/800, XL/XE models) to share peripherals.

MicroNet might be useful to a small business. It seems particularly well-suited to educational use in computer labs or for word processing in classrooms where you are only using the disk drives to save data. For example, I can envision a classroom with 24 Atari 130XEs, three MicroNets, three double-density disk drives, three printers and buffers, Basic XE, Kyan Pascal, ACTION!, Atari Logo, MAC/65, and ValFORTH. That would be one great programming lab!

In this hypothetical computer language lab, the three MicroNets and three printer buffers could replace the need for 21 printers and 21 disk drives for a savings of perhaps $16,000.

Operation is simple. Just plug your computers into the sides of the small white box, plug your peripheral daisy chain into the end, and plug the transformer into the wall. Everything works just like it did before, except for one difference— all eight computers can now share the same disk drive, printer and modem.

Actually "share" is not the right word—they take turns. When one computer is using the printer, for example, the whole bus (a path over which information is transferred) is occupied and the other computers cannot reach the other peripherals. For this reason Supra recommends a printer buffer (which will store information temporarily during these data transfers) to speed things up. A modem can also tie up the bus indefinitely.

This means students will have to take turns booting up software, printing files, etc. When you try to access the bus and find it busy, your computer will take time out and return an error message. You must try again and again. Supra has thoughtfully provided a modified DOS 2.5 which will keep trying for you until it gets a response. MicroNet does not noticeably slow down disk access. But there is a full five-second wait after one computer is finished before MicroNet releases the line for another computer.

Since the Atari has a serial port, custom cables (sold separately) can be constructed to any length. Thus, computers can be 100 feet or more away from the peripheral cluster.

It is important to remember that this is not a "true" network and there are many restrictions to its use. Most importantly, the computers cannot "talk" to each other. However, they can talk fully to the disks. There are no passwords or security protection methods. Also, since the MicroNet does not implement the audio lines, cassettes and a few direct connect modems will not work. Atari Corp. modems work fine but I recommend checking out your current hardware for compatibility before buying.

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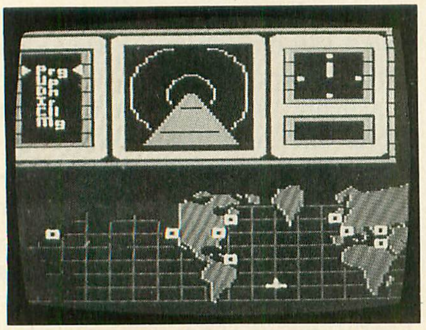
product reviews



HACKER

Activision
P.O. Box 7286
Mountain View, CA 94039
(415) 960-0410
$34.95, 48K disk

Reviewed by Harvey Bernstein

How many of us, after seeing the movie "War Games" a couple of years ago, fantasized about using our Ataris to break into the computer of some large, monolithic, quasi-governmental organization? Of course few actually tried it, and those who succeeded usually got caught. Now Activision gives you an opportunity for some vicarious thrills with **Hacker**, their latest Atari 8-bit release.

Hacker is supposed to simulate breaking into the system of a multinational corporation. It has no documentation, not even a title screen. All you see at the start is a screen that says "Logon, Please:" and prompts for a password. From here on, you are on your own. I don't want to say too much and ruin the game for anybody. But I will tell you that once inside the system, you discover evidence of corporate shenanigans. Figuring out how to gather the evidence, and what to do with it, is the ultimate goal of Hacker.

For me, the joy of the game was in deciphering information on the screen and figuring out what to do next. Alas, this ends much too quickly. Hacker features four or five "levels of discovery"—a point at which a new screen or a new game element is added. And it is up to the player to determine how to manipulate keyboard, joystick, etc. in order to progress. The problem is, an experienced game player will have the rules of Hacker figured out in a couple of hours, reducing it to little more than a slightly tedious adventure game. If author Steve Cartwright had added another five levels of discovery, it would have held my interest a lot longer.

In all fairness, there is a lot in this game to like. Once inside the system, the graphics and animation are first rate, among the best I've seen from Activision. And if you have the perserverance to finish, you will be rewarded in a big way! Without giving away the surprise, I suggest you play Hacker with the printer online and paper inserted. Activision once again came up with an original idea, excellently programmed. If only Hacker had a little more depth, it could become a true classic.

MICROPORT XL

Supra Corp.
1133 Commercial Way
Albany, OR 97321
(503) 967-9075
$49.95, 800XL/600XL only

Reviewed by Charles Cherry

MicroPort XL gives the Atari yet another way to interface with the rest of the world. It is not a finished system, but rather a starting point for the hardware hobbyist who wants to develop magical new input devices, printer interfaces, LED displays, home security and appliance controllers, robot controllers, video-or-laser-or-hard disk controllers—you name it. The instruction booklet gives hardware and software examples for several neat projects.

Essentially, Microport is a prototyping board which plugs into the expansion port of a 600XL or an 800XL. It can't be used on an Atari 400, 800, or 1200XL. A $30 adaptor plug is available for using it with the 130XE.

The board provides a 6520 PIA chip, address decoding, a 300 ma, 5 VDC external power supply, solder points for all of the bus lines and PIA I/O lines, and a 2 1/2×4 inch prototyping area.

The MicroPort XL can be used to gain access to the expansion port lines, but that makes it little more than an expensive 50-pin edge connector. It is really intended for use with the PIA. This provides two parallel ports. Do you need two more ports? Most people haven't even used up the the joystick ports. Well, I've always believed that you can't have too much hardware.

The new ports are undeniably convenient. A DIP switch maps them into your choice of 4 locations in the $D000 to $D700 area of the Atari. They cannot map over the $D300 page used by the Atari's PIA.

And as Supra says, "some assembly is required." Fortunately, assembly is easy and the PC board is clearly laid out and labeled. Unfortunately, the instructions are thoroughly confusing. I suggest working through the whole assembly, putting everything in the board before you solder anything down. You will discover that the 50-pin connector goes underneath the board, despite the booklet's insistence to the contrary.

Other minor adventures await you. My package had an extra capacitor. That's better than coming up short, but it's unnerving to have parts left over. Well, the MicroPort XL is aimed at hardware hackers who should be able to sort all this out.

Due to the experimental nature of this product I have not been able to

test it exhaustively. Therefore, this is more of a report than a review. But I did assemble it and tinker with it a bit, and it appears to do what Supra says it should.

LODE RUNNER'S ■ RESCUE

Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
$29.95, 48K disk

Review by David Plotkin

The enormously popular **Lode Runner** has a sequel that looks nothing like the original, but is a fine game in its own right. It even comes with its own game editor, so that you can make your own screens.

Lode Runner's Rescue looks strangely like a videogame version of "Alice in Wonderland". The goal is to use your joystick to guide the original Lode Runner's daughter, Alexandra, through 46 high-resolution 3-D screens, picking up the keys which will be necessary to free her dad.

Along the way, you must help Alexandra avoid the Bungeling guards, chase down a cat for extra lives, eat magic mushrooms for extra running and jumping power, and finally reach the square that will let her exit the screen and move on to the next one. Just as in the original Lode Runner, each screen must be solved for the correct method of getting all the keys.

The graphics of Lode Runner's Rescue must be rated superior. Each screen is seen in three-quarter perspective, as in ZAXXON. The colorful squares which make up each screen are often on multiple levels. Alexandra has limited jumping capabilities, activated by pressing the joystick button. Alexandra won't walk off a precipice which is too high for her (more than two squares high), but if you force her off by using the jump button, she will lose one of her lives.

There are also swiftly flowing rivers to swim. But the toughest part of solving each screen is the fact that Alexandra can be hidden behind the various walls which populate the playing

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field. You are then "driving blind," depending only on the sound cues to tell you whether you've hit a wall, fallen in a ditch, or are in the river. This is one game where the sound is absolutely necessary for play.

Playing Lode Runner's Rescue is quite a challenge. The base of the joystick must be turned diagonally and the stick pressed in the direction you want Alexandra to go. An extremely light touch is needed, otherwise she will go past the point you are aiming for. It is very frustrating to get caught by a guard because you missed your exit! But after a while, you do get used to the control scheme and play proceeds more smoothly.

The screen editor is very good and easy to use. Alexandra herself is the cursor for choosing where to put a square. And all the different game tiles are available across the top of the screen. You can choose which tile to use including such niceties as trap doors, what height to set the tile, and even the direction of the current in the river and the directions a guard will take at a certain point.

There is also an menu for loading and saving screens, or formatting a disk to hold your screens. The last screen in a series will hold the square that Lode Runner is trapped in, so that you can rescue him. You can even playtest new screens in a mode where you don't run out of lives.

My biggest problem with Lode Runner's Rescue is that the instructions are quite confusing. The Atari and Commodore versions are in one booklet, so you must pick out the information you need for your computer. Furthermore, the instructions are presented in a disjointed manner, and the summary of commands doesn't even include all the commands.

Lode Runner's Rescue is a well done action and puzzle solving game. It captures the spirit, if not the look, of the original. But then, who wants translated Apple games anyway? This one is pure Atari and looks it. I like Lode Runners Rescue a lot.

DR. SEUSS FIX-UP THE MIX-UP PUZZLER

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2525
$29.95, disk, ages 4-10

Reviewed by Gigi Bisson

Dr. Seuss Fix-up the Mix-Up Puzzler is simply a computer version of one of the little picture puzzles you used to find in a box of cereal. These puzzles divide a picture into small squares, with one square missing. You're supposed to reconstruct the scrambled picture by sliding the squares around.

This five-level game offers virtually the same thing, with the addition of annoying music that plays over and over again—and "animation." The six Dr. Seuss characters — including the Grinch, and the Cat in the Hat—wink, tap a foot, or nod crudely to indicate that the puzzle has been solved.

That's it. The child observes the original picture, presses the joystick button, and to the tune of crashing, banging pots and pans, the picture scrambles. Then, with a joystick, the child reassembles the picture.

The game's package promises "exciting opportunities to practice problem solving, sequencing, object and pattern recognition and logic and memory skills."

What gets delivered is an unimaginative program that fails to use the potential of the wildly rhymed Dr. Seuss books or the Atari's technology to add learning benefits onto a regular old cardboard jigsaw puzzle. We rightfully expect more from CBS, the software company responsible for the highly lauded Sesame Street educational series — especially when they have the great Dr. Seuss characters to work with.

COLONIAL CONQUEST

Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
$39.95, 48K disk

Reviewed by Rich Moore

Colonial Conquest immerses up to six players in the turbulence and excitement of the birth of the modern world. From the 1880s through the early 1900s, a handful of nations competed for wealth and power across the planet. They used their existing economic and technological advantages to exploit minor countries and build extensive empires. Frequently, they clashed, sometimes with smiles at diplomatic events, sometimes violently in battle.

The more successful leaders recognized that state dinners, alliances and declarations of war were tools from the same chest, and that a good diplomat was potentially more formidable than the general of an army. . . SSI has certainly captured the mood of this fascinating period in an excellent grand-strategy game. Besides being entertaining, the historic scenarios provide some interesting insights into the dynamics of imperialism as it grew from the strengths and weaknesses of the major nations.

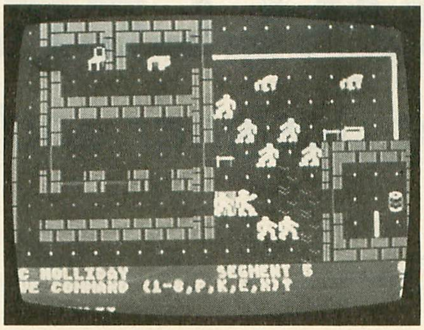
While it is possible to play Colonial Conquest solo, it is best played with a group—the more the better. The game's best feature is not automated. "Diplomacy" conducted with the other players provides both the most reward and the most danger. People whose egos bruise easily might want to avoid this since well-calculated treachery is a diplomatic staple.

The manual is well written and a very good reference, once you've worked with the program. It will not quite walk you through all the features, so some experimentation is required. Try either France or Germany with Britain neutral and the remaining countries on the computer at level zero for the first time.

There is a two-sided world chart, one side for each of the starting situations in the historical scenarios. It's very useful for locating areas in any of the games. A third world chart has a status board on the back, but I found that one of my own design was more useful. A lot of careful planning can be done in the beginning of the game, but the options narrow considerably after the first few moves.

The computer displays a smooth-scrolling chart of the world spreading over an area of 4×2 screens. It gives you intelligence (for a price!), displays your forces, exchanges money for armies, fleets and fortifications. You use it to make "loans" to other major nations, distribute foreign aid and slip bribes to corrupt governments. It moves forces as ordered and determines what happens to them at their destinations.

The graphics are very good. All input is via joystick, supplemented with the console keys. While basically a sound approach, it is all too easy (and frustrating) to skip a phase and get stuck. Don't rush any commands and you'll never worry about it. Games can be saved as standard DOS files once every four moves, just prior to spending money in preparation for the next set of moves. Save games often—this may well save you!



SIX-GUN SHOOTOUT

Strategic Simulations Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
$39.95, 48K disk

Reviewed by Brad Kershaw

The strategic decision-making challenge of squad-level wargames like **Computer Ambush** (July, 1985) comes to the Old West in SSI's new **Six-Gun Shootout**.

One or two players can relive nine of the West's legendary gunfights including Daltons' Demise, Rio Bravo, Battle of Ingalls—and of course the shootout at the O.K. Corral.

Each scenerio is based on history or popular legend. The characters represent actual participants involved—such as the Clanton boys vs. the Earp Brothers and Doc Holiday at O.K. Corral.

The program gives you the choice of accepting the historic characters as they were, or changing any of their characteristics and weapons.

Factors under your control include weapon speed and accuracy, movement speed and agility. Each character may carry up to three weapons, and one person on each side is allowed to use dynamite.

There are 18 different weapons to choose from. The player must take into consideration things such as range, penetration, accuracy, and number of bullets before reloading.

The character may be in one of three positions: prone, kneeling, or standing. This will have a great effect on the line of fire. For instance, if Doc Holiday is standing behind a barrel he could shoot a standing Billy Clanton. If Doc was in the prone position he would just hit the barrel.

There are also 21 different objects to hide behind—a wall, a covered wagon, a window, etc.

If Doc Holiday shoots Billy Clanton it would not neccesarily kill him. Billy could either be knocked down, hurt, or dead (although he usually must be hit more than once to die). The severity of the wound is determined by the weapon used, the character's attributes, and the location of the hit.

Fast, nerve-wracking action gets underway after you have armed your characters and chosen their attributes. The actual shootout starts and the computer calls on one gunfighter at a time—in totally random order and with a preset time limit!

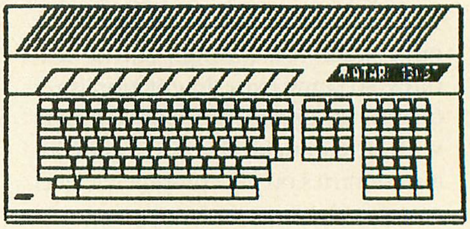
If you don't choose an action within the time limit, you lose your turn. The choices are: shoot, move, or reload. Trying to shoot when your gun is empty is another way to lose your turn.

When the bullets start flying, Six-gun Shootout demands a cool head, close attention and appropriate choices. The game actually does give you an insight into the kind of mind-set Wyatt Earp must have needed to survive the O.K. Corral.

PRINT SOFTWARE GALLERY

Typesetter, Page Designer and Rubber Stamp

Reviewed by GEORGE ADAMSON



XLEnt's **Typesetter** ($34.95), **Page Designer** and **Rubber Stamp** ($29.95 each) are ambitious printer utilities exclusively for the Atari. Even users without artistic skill will be able to do rather sophisticated mixing or even overlaying of graphics and various sizes of typography on the same page.

Typesetter is one of the first programs to take advantage of the 130XE's extra memory. Flip it over and there's Typesetter 65, a version for 48K and 64K Ataris.

The main program is divided into three parts. There's a text editor where font styles and sizes may be changed. The sketch pad will draw or stamp an icon in a desired location on the screen. And there are dot-matrix printer options. These are limited to Epson compatibles (including Gemini, although the printout may be 40 percent smaller) and NEC or ProWriter compatibles.

In Typesetter 65, the I/O functions allow loading of a font, a GR. 7+/8 screen, a Page Designer page, a Typesetter page, saving a type page, and reading the disk directory. Fortunately, the program can access a second disk drive.

Typesetter 130's 10 text editor functions include all of the above plus saving and loading pages and disk formatting. It can also italicize type, but the process becomes long and laborious if many lines are involved. It can also create special-effect "sliced" type.

An editor window in both versions displays current character height and width, row and column location of cursor, margin settings, and function messages. The computer even signals if a character is too wide for the end of the line. [CONTROL] R rotates letters horizontally or vertically across the page.

Sketch Pad mode has three different brush widths, six different fill patterns from solid to checkerboard, and built-in circle and sphere drawing commands. The 65 version is limited to joystick control, but the 130 program (which has an X-Y coordinate counter) also has KoalaPad or Atari Touch Tablet options.

Three print options are possible: vertical full height like a normal typewriter page (resolution 702×312 for 65 and 768×336 for 130), vertical half-page height, or horizontal full-page sideways.

Instead of the usual 320×192 resolution limitation in Graphics 0, Typesetter 65 allows printing with 704×624 resolution. Typesetter 130 allows maximum resolution of 768×672. While the 65 version uses one continuous block of memory (with only three bytes to spare), the 130 version divides a page into top and bottom halves.

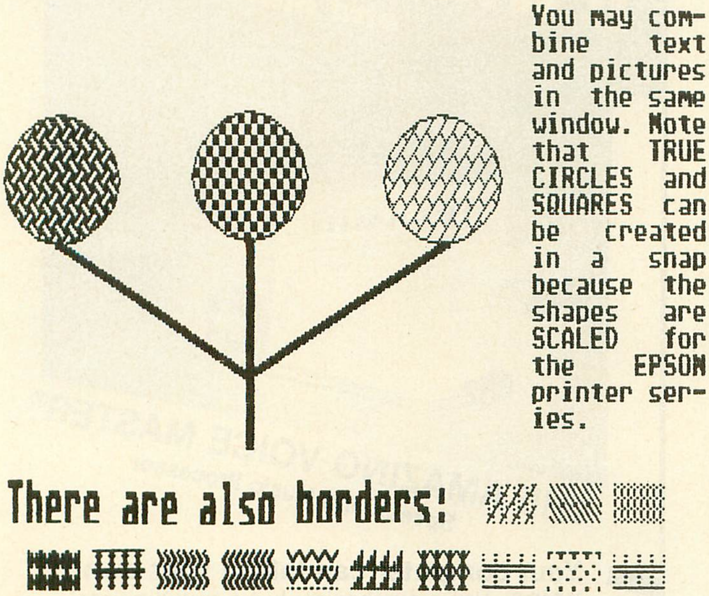
The whole page is viewed through a scrolling window (like a spreadsheet). It uses a "page" of 88 columns, so saved Graphics 7+/8 or Page Designer screens can either be placed in the middle 40 columns or expanded to fit the middle 80 columns.

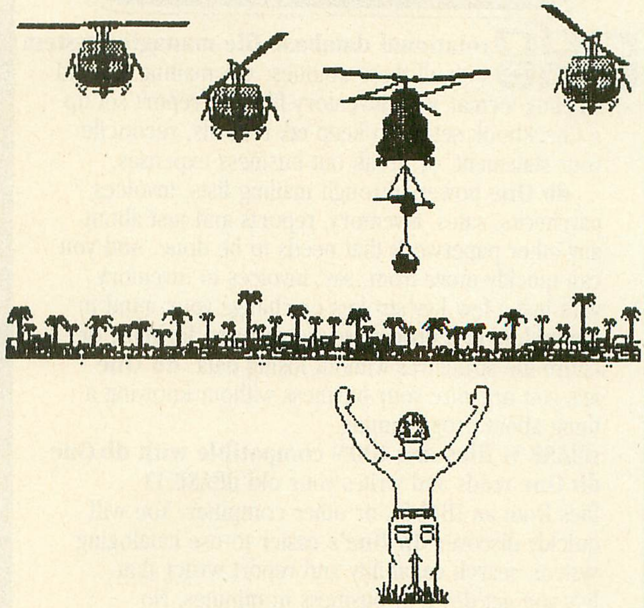
Typesetter's instruction book is very thorough but you'll probably have read it several times before running the program to learn the many [CONTROL] options.

PAGE DESIGNER

Companion program Page Designer (48K only) is not as spectacular as Broderbund's popular $44.95 Print Shop (**Antic**, June 1985), but it's very functional, easily saves screens, and is better for mostly-text files such as newsletters.

It creates half of a page at a time, can display legible 80-column type on





a monitor or TV screen, serves as a layout guide for Typesetter, and includes a utility that decompresses KoalaPad and Atari Touch Tablet files to use with the software.

There are 14 character fonts to pick from by stepping through the directory with the [RETURN] key and then using the [SPACE BAR] to make a type choice. Another font creates borders, but the graphics mode uses only a joystick.

All the commands are shown in the screen window. However, documentation is very sketchy, not even mentioning which printers are supported.

RUBBER STAMP

Rubber Stamp (48K only) lets you create and save your own little icons. It can be a stand-alone printer utility, or used with other XLEnt packages. It, too, works with Epson-compatible printers (with special options for Gemini or Mannesmann) or NEC and ProWriter compatibles. The command structure is similar to Typesetter 130, and a second drive is helpful but not necessary.

One of Rubber Stamp's four utilities would alone justify its purchase—the ability to convert any Print Shop icon into Typesetter format. Typesetter icons cannot be converted to Print Shop, however, because they are higher resolution (more dots per space). And besides, who would want to do it anyway?

The main Rubber Stamp program divides the screen into four quadrants. A picture or text can be stamped in any of them. Then the stamp can be moved anywhere on the screen, or expanded, shrunk, mirrored, duplicated, rotated, reversed, and turned upside down. Ruber Stamp can also produce labels, 1-99 at a time.

The graphics editor allows joystick or touch tablet drawing and filling, plots true circles, spheres, ellipses, and boxes, and sets up inverse video for digitized photos. Although Rubber Stamp is quite versatile, it lacks HELP screens because the programmers tried to cram as many features as possible into 48K. Therefore, a new user must keep the extensive and well-done documentation at hand.

The text editor includes many of the special effects found in Typesetter such as italicized and sliced type, 32 height and width combinations, and type overlaid on art.

With the extremely fast 16×16 editor, you can create your own character sets by using a joystick or the arrow keys, and toggling individual bits on or off with the fire button or spacebar. The joystick method is faster. Each character is displayed in an editing window by selecting the corresponding ASCII number 0-127. Then characters can be saved to disk.

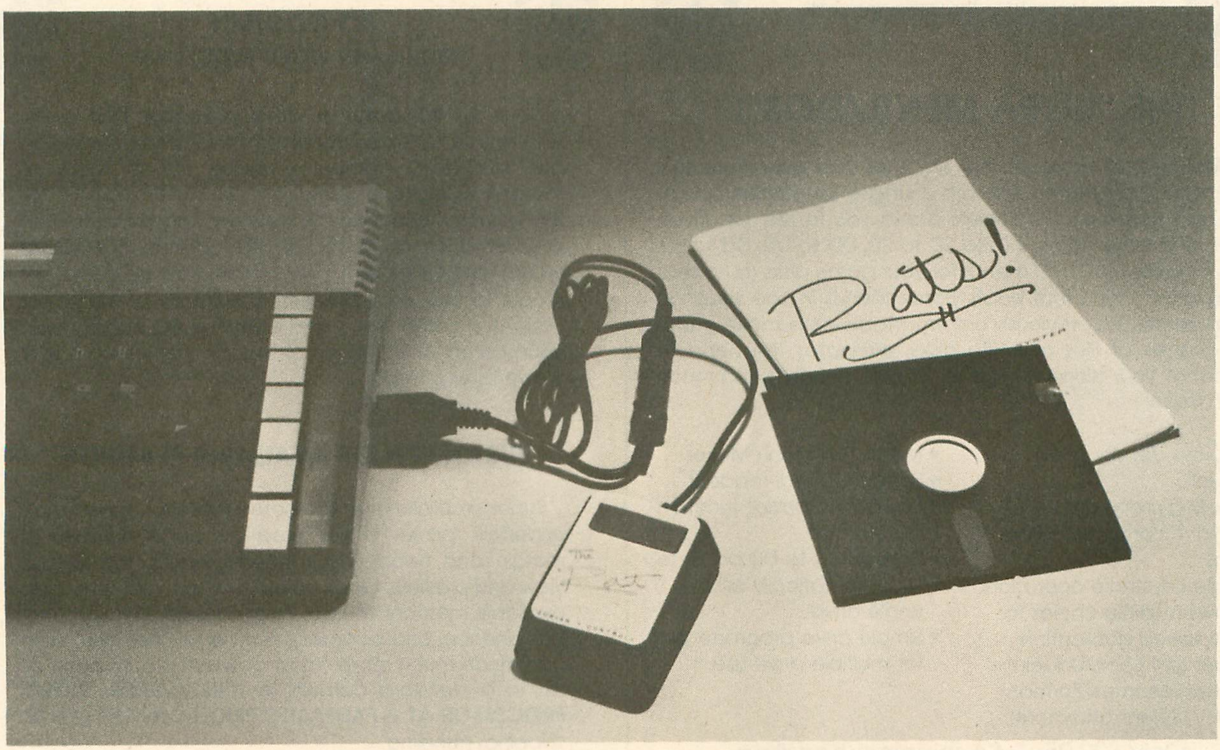
Once you have Typesetter, Page Designer, Rubber Stamp and a compatible dot-matrix printer, the only other thing you'll need is a copy machine to handle your printing needs right at home.

TYPESETTER
($34.95, 48K or 128K disk)

PAGE DESIGNER,
RUBBER STAMP
($29.95 each, 48K disk)

XLEnt Software
P.O. Box 5228
Springfield, VA 22150
(703) 644-8881

DON'T BE LEFT OUT!



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SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

DISK SUBSCRIBERS: You can use all these programs immediately. Just follow the instructions in the accompanying magazine articles.

Antic program listings are typeset on the Star's SB-10 printer—from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	CTRL ,	●	CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H	↑	ESC CTRL −
	CTRL I	↓	ESC CTRL =
	CTRL J	←	ESC CTRL +
	CTRL K	→	ESC CTRL *
	CTRL L	◆	CTRL .
	CTRL M	♠	CTRL ;
	CTRL N		SHIFT =
	CTRL O		ESC SHIFT CLEAR
♣	CTRL P		
	CTRL Q		
	CTRL R	◀	ESC DELETE
	CTRL S	▶	ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	人CTRL ,		人CTRL Y
	人CTRL A		人CTRL Z
	人CTRL B	↑	ESC SHIFT DELETE
	人CTRL C		
	人CTRL D		
	人CTRL E	↓	ESC SHIFT INSERT
	人CTRL F		
	人CTRL G		
	人CTRL H	←	ESC CTRL TAB
	人CTRL I		
	人CTRL J		
	人CTRL K	→	ESC SHIFT TAB
	人CTRL L		
	人CTRL M		
	人CTRL N		人CTRL .
	人CTRL O		人CTRL ;
	人CTRL P		人SHIFT =
	人CTRL Q		ESC CTRL 2
	人CTRL R	◀	ESC CTRL DELETE
	人CTRL S		
	人CTRL T		
	人CTRL U	▶	ESC CTRL INSERT
	人CTRL V		
	人CTRL W		
	人CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key 人 instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL			STANDARD		
		CTRL F	/		/
		CTRL G	\		SHIFT +
		CTRL N	—		SHIFT -
		CTRL R	-		−
		CTRL S	+		+

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for **Antic's** type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II"

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

ATARI 'TOONS

August 1985

The 22nd character in line 1090 of listing 2 is an A. Also, to load non-standard character sets, change NUMBER=1024 in line 1140 to: NUMBER=2050, and change line 1150 to: 1150 GOTO 1170.

GUESS THAT SONG

July 1985

The September, 1985 HELP! section contains an easier-reading listing of some of the tougher data lines in Guess That Song.

STAR VENTURE

July 1985

Change line 380 to:

```
380 IF PEEK(53279
)=6 THEN SOUND 0,
0,0,0:GOTO 80
```

MUSICIAN

June 1985

Change line 790 to:

```
790 IF A=54 THEN
POSITION 4,22:? #
6;"song cleared":
GOTO 810
```

And if you're having tempo problems, remove line 1720 and add the following:

```
1715 IF A=14 THEN
 TEMPO=-0.25:GOTO
 1700
1720 REM REMOVE T
HIS LINE
```

MANEUVER

April 1985

If you get hearts on the title screen, LIST the program to disk or cassette, type NEW, then ENTER and SAVE it.

FONT MAKER FOR SG-10

March 1985

The July 1985 issue of ANTIC contains a listing which, when merged with FONT MAKER, makes that program work on the Star SG-10. See the HELP section of that issue for instructions.

CUSTOM PRINT

March 1985

Custom Print has problems printing certain characters using redefined characters. Change line 5 to:

```
5 CS=PEEK(106)-8:
POKE 106,CS-1:GRA
PHICS 0:DIM CST$(
20):CST$=""
```

T-SHIRT CONSTRUCTION SET

Article on page 37

LISTING 1

Don't type the TYPO II Codes!

```
CF 10 REM T.S.C.S.  LISTING 1
WZ 20 REM BY CHARLES JACKSON AND PATRICK
   BASS
FW 30 REM (c) 1985, ANTIC PUBLISHING
MY 40 DIM A$(112),IN$(18),OUT$(18),MA$(55
   )
AZ 45 GRAPHICS 0:POKE 710,14:POKE 712,14:
   POKE 709,0
KA 48 POSITION 5,3:? "T-Shirt Constructio
   n Set":? ,"(T.S.C.S.)"
ET 50 POSITION 3,21:? "By Charles Jackson
    and Patrick Bass"
DD 51 ? :? "      (c) 1985, Antic Publishi
   ng";
RZ 52 POSITION 2,5:? :? "1) For Micropain
   ter":? "2) For Koala":? "3) Graphics 8
   "
QM 53 INPUT SRC:IF  NOT (SRC=1 OR SRC=2 O
   R SRC=3) THEN 50
PU 55 POSITION 1,10:? "      Source Filena
   me: ";:INPUT IN$
GC 60 POSITION 1,10:? "Destination Filena
   me: ";:INPUT OUT$
QU 70 TRAP 50:GRAPHICS 8+16:POKE 710,0
HG 75 IF SRC=3 THEN A$="hh[illegible]
   [illegible]
   ":GOTO 130
AR 80 MA$(1,55)="h[illegible]
   [illegible]"
MZ 90 MA$(29,29)=CHR$(255)
JC 100 JNK=USR(ADR(MA$))
EB 110 A$(1,66)="hh[illegible]
   [illegible]
   [illegible]"
HI 120 A$(67,112)="[illegible]
   [illegible]"
DO 130 CLOSE #1:OPEN #1,4,0,IN$
DA 135 SCREEN=PEEK(88)+PEEK(89)*256:IO=84
   8
LE 140 IF SRC=2 THEN 5000
QH 150 POKE IO+2,7:POKE IO+4,PEEK(88)
TO 160 POKE IO+5,PEEK(89):POKE IO+8,0:POK
   E IO+9,30
XR 170 JNK=USR(ADR("hhh[illegible]LV[illegible]"),16):IF SRC>
   1 THEN 190
UR 172 GET #1,M:POKE 712,M
UM 180 FOR X=708 TO 710:GET #1,M:POKE X,M
   :NEXT X:CLOSE #1
AG 185 REM  PICTURE IS ON THE SCREEN
KV 190 FOR X=1 TO 192
FS 200 OFFSET=40*X-39
XF 210 ADDR=SCREEN+OFFSET-1
FN 220 JNK=USR(ADR(A$),ADDR)
NE 230 NEXT X:CLOSE #1:OPEN #1,8,0,OUT$
JY 240 POKE IO+2,11:POKE IO+4,PEEK(88)
TN 250 POKE IO+5,PEEK(89):POKE IO+8,0:POK
   E IO+9,30
BX 260 JNK=USR(ADR("hhh[illegible]LV[illegible]"),16):IF SRC>
   1 THEN CLOSE #1:GRAPHICS 0:RUN
GC 270 PUT #1,PEEK(712)
MU 280 FOR X=708 TO 710:PUT #1,PEEK(X):NE
   XT X:CLOSE #1:GRAPHICS 0:RUN
JO 5000 REM LOAD A KOALA PICTURE
HI 5001 DIM MAIN$(342)
MF 5010 RESTORE 5050
LD 5020 FOR A=1536 TO 1556
WI 5030 READ B:POKE A,B
BV 5040 NEXT A
VX 5050 DATA 162,16,169,1,157,72,3,169,0,
   157,73,3,32,86,228,48,1,96,104,104,96
DU 5070 MAIN$="h[illegible]
   [illegible]"
EC 5080 MAIN$(55)="[illegible]
   [illegible]"
QF 5090 MAIN$(115)="[illegible]
   [illegible]
   "
PJ 5100 MAIN$(175)="[illegible]
   [illegible]"
UF 5110 MAIN$(228)=CHR$(155)
AV 5120 MAIN$(229)="[illegible]
   [illegible]
   [illegible]"
WI 5130 MAIN$(291)="[illegible]
   [illegible]"
MV 5560 A=USR(ADR(MAIN$))
MZ 5600 CLOSE #1
RO 5700 GOTO 190
```

LISTING 2

```
MX 10 REM T-SHIRT CONSTRUCTION SET, LISTI
   NG 2
RZ 11 REM (CREATES LINES 75,80,110,120 AN
   D 5070-5130.)
ER 20 REM BY C. JACKSON & P. BASS
FW 30 REM (c) 1985, ANTIC PUBLISHING
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
VS 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED.
YS 80 GRAPHICS 0:? "     ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "[illegible]TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "[illegible]TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
JQ 1000 DATA 780
CA 1010 DATA 0550530320730700320830820670
   61051032084072069078032065036061034104
   104133193104133192169000133
PU 1020 DATA 2131600391771921532080061360
   16248160039162000189208006132196133194
   169000133195160007038194102
PS 1030 DATA 1951360162491651951641961451
   92223213601622609603405807107908407903
   2049051048155056048032077065
JD 1040 DATA 0360400049044053053041061034
   10417304800213300017304900213300116019
   9177000170041015201015208004
TP 1050 DATA 2021381450001361920322082381
   65088024105001133000165089105030133001
   160003177000153196002136016
```

```
EY 1060 DATA 248096034155049049048032065036040004904405405404106103410410413319310413319216000016203916900
JR 1070 DATA 141192006141193006141194006141195006177192074110192006074110192006074110193006074110193006074
JB 1080 DATA 110194006074110194006074110195006169000024014192006042034155049050048032065036040
WZ 1090 DATA 054055044049049050041061034014192006042014193006042014193006042014194006042014194006042014195
CO 1100 DATA 006042014195006042157208006200202016166160039185208006145192136016248096034155053048055048032
IM 1110 DATA 077065073078036061034104162016169007157066003169232157068003169000157069003169001157072003169
OZ 1120 DATA 000157073003169000133224032000006165224201007240013201013240016201026240060230224024144234034
YM 1130 DATA 155053048056048032077065073078036040005305304106103416523213323402414424416523214111960022302
24
IA 1140 DATA 032000006165232141197002230224032000006165232141198002230224032000006165232141199002230224032
DX 1150 DATA 000006165232141200002024144196169000133236133034155053048057048032077065073078036040049049053
```

```
BS 1160 DATA 041061034230165088133224133228165089133225133229032000006192136240094169000133227165232041128
HA 1170 DATA 133235165232041127133226208014032000006165232133227032000006165232133226198226165235208028032
OB 1180 DATA 000034155053049048048032077065073078036040049055053041061034006165232133233024144047198226169
BA 1190 DATA 255197226208245198227169255197227208237240183032000006165232133233024144019198226169255197226
XQ 1200 DATA 208238198227169255197227208230240034155053049049048032077065073078036040050050056041061067072
AB 1210 DATA 082036040049053053041155053049050048032077065073078036040050050057041061034096169002197234240
YU 1220 DATA 082240201165233160000145224024169080101224133224169000101225133225230230169096197230208047169
NA 1230 DATA 001197236208024024169001101228133224169000133236133230101229133229133034155053049051048
TZ 1240 DATA 032077065073078036040050057049041061034225024144017230236024169040101228133224169000133230101
UD 1250 DATA 229133225165235240176208149165233160000145224024169001101224133224169000101225133225165235240
CL 1260 DATA 151208229034155
```

best color printing under $1,000?

RADIO SHACK COLOR PRINTER MEETS ATARI

Article on page 22

LISTING 1

Don't type the TYPO II Codes!

```
RK 1 REM CGP-220 SCREEN DUMP PROGRAM
IN 2 REM BY STAN SUBEK
UD 3 REM ANTIC PUBLISHING
RK 10 DIM COL(4),CL$(12),DL$(33),DIO$(42)
   ,FN$(15),R$(80),G$(80),B$(80),C(75),PR
   T$(240)
AZ 15 REM READ ML ROUTINES & COLOR DATA
UH 20 GOSUB 790
UH 30 POKE 752,0:POKE 82,2:? :? "ENTER DE
   V:FILENAME.EXT";:INPUT FN$
YW 35 REM MODIFY DISPLAY LIST
KA 40 GRAPHICS 24:SCR=PEEK(88)+PEEK(89)*2
   56:ASM=USR(ADR(DL$))
OW 45 REM READ DATA FROM DISK
LD 50 CLOSE #1:OPEN #1,4,0,FN$:ASM=USR(AD
   R(DIO$),1,7,SCR,7680)
SI 60 GET #1,X:POKE 712,X:COL(1)=X
XI 70 GET #1,X:POKE 708,X:COL(2)=X
ZF 80 GET #1,X:POKE 709,X:COL(3)=X
UD 90 GET #1,X:POKE 710,X:COL(4)=X
KX 100 CLOSE #1
BE 105 FOR I=1 TO 12:CL$(I,I)=" ":NEXT I
AF 107 REM COLOR TABLE
MZ 110 FOR I=1 TO 4
SD 120 X=0:IF COL(I)<4 THEN 600
WQ 130 X=1:IF COL(I)<12 THEN 600
AB 140 X=2:IF COL(I)<16 THEN 600
IT 150 X=12:IF COL(I)<20 THEN 600
PP 160 X=13:IF COL(I)<28 THEN 600
LX 170 X=14:IF COL(I)<32 THEN 600
OP 180 X=12:IF COL(I)<36 THEN 600
OC 190 X=22:IF COL(I)<44 THEN 600
QS 200 X=13:IF COL(I)<48 THEN 600
ZZ 210 X=3:IF COL(I)<52 THEN 600
ZN 220 X=4:IF COL(I)<60 THEN 600
CY 230 X=5:IF COL(I)<64 THEN 600
TE 240 X=15:IF COL(I)<68 THEN 600
SS 250 X=16:IF COL(I)<76 THEN 600
PA 260 X=17:IF COL(I)<80 THEN 600
FU 270 X=9:IF COL(I)<84 THEN 600
PK 280 X=10:IF COL(I)<92 THEN 600
TA 290 X=11:IF COL(I)<96 THEN 600
PO 300 X=10:IF COL(I)<100 THEN 600
XX 310 X=24:IF COL(I)<108 THEN 600
UZ 320 X=19:IF COL(I)<112 THEN 600
YD 330 X=18:IF COL(I)<116 THEN 600
XQ 340 X=19:IF COL(I)<124 THEN 600
YP 350 X=20:IF COL(I)<128 THEN 600
WP 360 X=18:IF COL(I)<132 THEN 600
WC 370 X=19:IF COL(I)<140 THEN 600
XB 380 X=20:IF COL(I)<144 THEN 600
DA 390 X=19:IF COL(I)<148 THEN 600
ZH 400 X=21:IF COL(I)<156 THEN 600
UU 410 X=20:IF COL(I)<160 THEN 600
LG 420 X=7:IF COL(I)<164 THEN 600
XT 430 X=21:IF COL(I)<172 THEN 600
AX 440 X=20:IF COL(I)<176 THEN 600
JN 450 X=6:IF COL(I)<180 THEN 600
QI 460 X=7:IF COL(I)<188 THEN 600
MP 470 X=8:IF COL(I)<192 THEN 600
PJ 480 X=6:IF COL(I)<196 THEN 600
HX 490 X=7:IF COL(I)<204 THEN 600
KT 500 X=8:IF COL(I)<208 THEN 600
GM 510 X=7:IF COL(I)<212 THEN 600
FZ 520 X=8:IF COL(I)<220 THEN 600
JH 530 X=8:IF COL(I)<224 THEN 600
MI 540 X=7:IF COL(I)<228 THEN 600
ZM 550 X=23:IF COL(I)<236 THEN 600
VA 560 X=13:IF COL(I)<240 THEN 600
YE 570 X=12:IF COL(I)<244 THEN 600
XQ 580 X=22:IF COL(I)<252 THEN 600
YU 590 X=13
YG 600 CL$(I,I)=CHR$(C(1+3*X))
```

continued on next page

```
YL 610 CL$(I+4,I+4)=CHR$(C(2+3*X))
DM 620 CL$(I+8,I+8)=CHR$(C(3+3*X))
GC 630 NEXT I
BD 635 REM PRINT 2 LINES OF DOTS FOR EACH
   SCREEN LINE
DU 640 FOR I=1 TO 80:R$(I,I)=" ":G$(I,I)=
   " ":B$(I,I)=" ":NEXT I
IL 650 CLOSE #3:OPEN #3,8,0,"P:"
DJ 660 AR=ADR(R$):AG=ADR(G$):AB=ADR(B$):A
   C=ADR(CL$):AP=ADR(PRT$)
EO 670 FOR I=0 TO 191
NX 680 X=USR(AP,AR,AG,AB,AC,SCR+40*I)
MX 690 FOR J=1 TO 2
AH 700 PRINT #3;CHR$(27);"C";
XT 710 PRINT #3;CHR$(80);
SW 720 PRINT #3;R$;
NA 730 PRINT #3;G$;
KK 740 PRINT #3;B$;
GR 750 NEXT J
GJ 760 NEXT I
MP 770 CLOSE #3
OM 780 END
KG 785 REM DISK INPUT ROUTINE
UY 790 FOR I=1 TO 42:READ X:DIO$(I,I)=CHR
   $(X):NEXT I
GI 800 DATA 104,104,104,10,10,10,10,170,1
   04,104,157,66,3,104,157,69,3,104,157,6
   8,3
KK 810 DATA 104,157,73,3,104,157,72,3,32,
   86,228,169,0,133,213,189,67,3,133,212,
   96
HC 815 REM DISPLAY LIST ROUTINE
TL 820 FOR I=1 TO 33:READ X:DL$(I,I)=CHR$
   (X):NEXT I
XE 830 DATA 104,173,48,2,133,203,173,49,2
   ,133,204,160,1,200,177,203
RY 840 DATA 201,15,240,4,201,79,208,4,233
   ,1,145,203,192,200,208,237,96
NT 845 REM COLOR DATA (RGB)
AJ 850 FOR I=1 TO 75:READ X:C(I)=X:NEXT I
TQ 860 DATA 0,0,0,5,5,5,15,15,15,10,0,0,1
   5,0,0,15,5,5
HC 870 DATA 0,10,0,0,15,0,5,15,5,0,0,10
ZD 880 DATA 0,0,15,5,5,15,10,10,0,15,15,0
BI 890 DATA 15,15,5,10,0,10,15,0,15,15,5,
   15
GU 900 DATA 0,10,10,0,15,15,5,15,15
UM 910 DATA 0,10,5,15,5,0,5,15,0,0,5,15
HH 915 REM PRINT DATA CALCULATION
DB 920 FOR I=1 TO 240:READ X:PRT$(I,I)=CH
   R$(X):NEXT I
AJ 930 DATA 104,104,133,204,104,133,203,1
   04,133,206,104,133,205,104,133,208,104
   ,133,207,104,133,3,104,133,2
PH 940 DATA 160,0,177,2,153,0,6,200,192,1
   2,208,246,104,133,3,104,133,2,169,0,14
   1,12,6,168,177
EC 950 DATA 2,41,48,74,74,74,74,170,189,0
   ,6,141,13,6,189,4,6,141,14,6,189,8,6,1
   41,15
GW 960 DATA 6,177,2,41,192,74,74,74,74,74
   ,74,24,144,3,24,144,213,170,189,0,6,10
   ,10,10,10
SO 970 DATA 24,109,13,6,145,203,189,4,6,1
   0,10,10,10,24,109,14,6,145,205,189,8,6
   ,10,10,10
MX 980 DATA 10,24,109,15,6,145,207,192,1,
   208,68,24,144,3,24,144,206,238,12,6,17
   3,12,6,201,40
EQ 990 DATA 208,1,96,162,0,136,230,2,165,
   2,201,0,208,2,230,3,230,203,165,203,20
   1,0,208,2,230
JL 1000 DATA 204,230,205,165,205,201,0,20
   8,2,230,206,230,207,165,207,201,0,208,
   2,230,208,232,224,2,208
WU 1010 DATA 221,24,144,141,177,2,41,3,17
   0,189,0,6,141,13,6,189,4,6,141,14,6,18
   9,8,6,141
MQ 1020 DATA 15,6,177,2,41,12,74,74,200,2
   4,144,158,0,0,0
AI 1030 RETURN
```

assembly language

MULTI-COLORED PLAYERS

Article on page 35

LISTING 1

```
0100 ;D1:MCP.M65
0110 ;
0120       .TITLE "MULTI-COLOR PLAYER"
0130 ; V.100685, BY PATRICK BASS
0140 ; (c) 1985, ANTIC PUBLISHING
0150 ;
0160       .SET 1,20
0170       .TAB 8,12,30
0180 TOTALCODE = ENDCODE-STARTOFCODE
0190       .OPT NO LIST
0200       .OPT NO MLIST
0210 ;
0220 STARTOFCODE = $3000
0230 ;
0240 ;-----------------------------
0250 ; Display List equates...
0260 ;
0270 ; OFFSET is the number of scan
       lines down the line-by-line
0280 ;  coloring starts.
0290 OFFSET = $20
0300 BLANK8 = $70      ;Blank 8 lines.
0310 LMS =    $40      ;Load Mem Scan.
0320 MODE6 = 6         ;ANTIC mode 6.
0330 INT =    $80      ;DL Interrupt.
0340 JMPWT = $41       ;Jump, wait.
0350 ;
0360 ;-----------------------------
0370 ; Following are ATARI standard.
0380 WSYNC = $D40A     ;Hsync waiter.
0390 ;
0400 COLPM0 = $D012   ;Player/Missile
0410 COLPM1 = $D013   ;Hardware color
0420 COLPM2 = $D014   ;registers.
0430 COLPM3 = $D015
0440 ;
0450 SDLSTL = $0230   ;Dlist shadow
0460 VVBLKD = $0224   ;Vblank pointer
0470 VDSLST = $0200   ;DLI pointer
0480 HPOSP0 = $D000   ;H position.
0490 IRQEN = $D20E    ;IRQ enable.
0500 POKMSK = $10     ;...and shadow.
0510 NMIEN = $D40E    ;NMI enable.
0520 GPRIOR = $026F   ;Global priority
0530 PMBASE = $D407   ;Player base
0540 GRACTL = $D01D   ;Graphic control
0550 SDMCTL = $022F   ;Shadow DMA cont
0560 SKCTL = $D20F    ;Serial Control
0570 RANDOM = $D20A
0580 ;
0590 ;-----------------------------
0600 ; Default Player Box Boundaries.
0610 YMIN =  40
0620 YMAX =  170
0630 XMIN =  50
0640 XMAX =  190
0650 ;
0660 ;-----------------------------
0670 ; Default Vertical positions.
```

```
0680 VP0 =    YMIN+[[YMIN+YMAX]/8]
0690 VP1 =    [YMIN+YMAX]/2
0700 VP2 =    YMAX-[[YMIN+YMAX]/8]
0710 VP3 =    [YMIN+YMAX]/2
0720 ;
0730 ;----------------------------
0740 ; Default Horizontal positions.
0750 HP0 =    [XMIN+XMAX]/2
0760 HP1 =    XMAX-[[XMIN+XMAX]/8]
0770 HP2 =    [XMIN+XMAX]/2
0780 HP3 =    XMIN+[[XMIN+XMAX]/8]
0790 ;
0800 ;----------------------------
0810 ; Default Player Base color.
0820 P0C =    $30
0830 P1C =    $C0
0840 P2C =    $50
0850 P3C =    $90
0860 ;
0870 ;----------------------------
0880 ; ...and claim how many players
           are currently active.
0890 ACTIVE = 4
0900 ;
0910 ;----------------------------
0920      *=  $2000
0930 ; Starting at $2000, hold a
          place for the player number.
0940 CURRPLR
0950      .BYTE 0
0960 ;
0970 ;----------------------------
0980 ; Remember in order, 0-1-2-3,
        how fast everyone should move.
0990 MEMSPEED
1000      .BYTE 0,0,0,0
1010 ;
1020 ;----------------------------
1030 ;
1040 ; Remember in order, 0-1-2-3,
        how fast everyone is moving.
1050 SPEED
1060      .BYTE 0,0,0,0
1070 ;
1080 ;----------------------------
1090 ;This is how many dots to move
1100 ;each step. Range 1-3.
1110 VSTEP
1120      .BYTE 1,1,1,1
1130 HSTEP
1140      .BYTE 1,1,1,1
1150 ;
1160 ;----------------------------
1170 ; This is the shape that is
        drawn onto each player.
1180 PLRGRAF0
1190      .BYTE 0,0,0,0
1200      .BYTE $18,$3C,$7E,$FF,$18,$18
,$18,$7E
1210      .BYTE $42,$7E,$5A,$24,$18
1220      .BYTE 0,0,0,0,0,0,0
1230 ;
1240 PLRGRAF1
1250      .BYTE 0,0,0,0
1260      .BYTE $FF,$FF,$7E,$7E,$3C,$3C
,$18,$FF
1270      .BYTE $FF,$18,$3C,$3C,$7E
1280      .BYTE 0,0,0,0,0,0,0
1290 ;
1300 PLRGRAF2
1310      .BYTE 0,0,0,0
1320      .BYTE $3C,$18,$3C,$42,$A9,$81
,$42,$24
1330      .BYTE $3C,$3C,$5A,$42,$3C
1340      .BYTE 0,0,0,0,0,0,0
1350 ;
1360 PLRGRAF3
1370      .BYTE 0,0,0,0,24,126,255,255,
255,255,255
1380      .BYTE 255,255,255,255,126,24,
0,0,0,0,0
1390 ;
1400 ;----------------------------
1410 ; Current player Horizontal
        position while moving.
1420 HPOSITION
1430      .BYTE HP0,HP1,HP2,HP3
1440 ;
1450 ;----------------------------
1460 ; Current Player Vertical
        position while moving.
1470 VPOSITION
1480      .BYTE VP0,VP1,VP2,VP3
1490 ;
1500 ;----------------------------
1510 ; 'PDIRECTION' is where we keep
        track of which direction each
1520 ; player is currently moving.
1530 ;
1540 ; bit7 clear="move down"
1550 ; bit7   set="move up"
1560 ; bit6 clear="move right"
1570 ; bit6   set="move left"
1580 PDIRECTION
1590      .BYTE 0,$40,$80,$C0
1600 ;
1610 ;----------------------------
1620 ; Another useful mem loc
1630 THISPLAYER
1640      .BYTE 0
1650 ;
1660 ;----------------------------
1670 ; Reserve, at $6000, four pages
        of memory for the players's
1680 ; color memory map.
1690 PCBASE = $6000
1700 P0COLR = PCBASE
1710 P1COLR = PCBASE+$0100
1720 P2COLR = PCBASE+$0200
1730 P3COLR = PCBASE+$0300
1740 ;
1750 ;----------------------------
1760 ; Reserve, at $7000, four pages
        of memory for the player
1770 ; shapes on the screen.
1780 PBASE = PCBASE+$1000
1790 P0RAM = PBASE+$0400
1800 P1RAM = PBASE+$0500
1810 P2RAM = PBASE+$0600
1820 P3RAM = PBASE+$0700
1830 ;
1840 ;----------------------------
1850 ; Reserve space at $8000 for the
        television display.
1860 SCREEN = PCBASE+$2000
1870 ;
1880 ;----------------------------
1890 ; Build a table of player shape
        addresses in player order.
1900 PLAYERTABLE
1910      .WORD P0RAM,P1RAM
1920      .WORD P2RAM,P3RAM,P3RAM
1930 ;
1940 ;----------------------------
1950 ; Build a table of player color
        addresses in player order.
1960 CPLAYERTABLE
1970      .WORD P0COLR,P1COLR
1980      .WORD P2COLR,P3COLR,P3COLR
1990 ;
2000 ;----------------------------
2010 ; Build a table of player color
        source addresses in plr order.
2020 SPLAYERTABLE
2030      .WORD P0COLG,P1COLG
2040      .WORD P2COLG,P3COLG,P3COLG
2050 ;
2060 ;----------------------------
2070 ; Build a table of player shape
        source addresses.
2080 GPLAYERTABLE
2090      .WORD PLRGRAF0,PLRGRAF1
2100      .WORD PLRGRAF2,PLRGRAF3
2110      .WORD PLRGRAF3
2120 ;
2130 ;----------------------------
2140 ; This is a short Display List.
2150 TLIST
2160      .BYTE BLANK8,BLANK8,BLANK8
2170      .BYTE LMS+MODE6+INT
2180      .WORD SCREEN
2190 ;
2200      .BYTE JMPWT
2210      .WORD TLIST
2220 ;
2230 ;----------------------------
2240 ; Reserve obscene amounts of Z
2250      *=  $80
2260 SWITCH *= *+1
2270 POINTER *= *+2
2280 ;
```

continued on next page

```
2290 ;-----------------------------
2300 ; DEFINE MACROS
2310 ; MACRO #1:"LDW source,memory"
2320 ; say:"Load-Word"
2330 ; This first macro will load
       the WORD value of a label
2340 ; into a two-byte memory
       location, forming a pointer.
2350 ; EXAMPLE:
2360 ;      LDW  SOURCE,POINTER
2370 ;...will load the LO, HI bytes
       that make up the label SOURCE
2380 ; into memory locations POINTER,
       POINTER+1.
2390 ;
2400        .MACRO LDW
2410        LDA # <%1
2420        STA %2
2430        LDA # >%1
2440        STA %2+1
2450        .ENDM
2460 ;
2470 ;-----------------------------
2480 ; MACRO #2 "NEWPAGE"
2490 ; This macro will force the
       program counter to the
2500 ; next higher page number, even.
2510 ; EXAMPLE:
2520 ;  (program counter now $4322)
2530 ;       NEWPAGE
2540 ;  (program counter now $4400)
2550 ;
2560 ;Follow:            *=$4322
2570        .MACRO NEWPAGE
2580        *=  *&$FF00 ; *=$4300
2590        *=  */$0100 ; *=$0043
2600        *=  *&$FF   ; *=$43
2610        *=  *+1     ; *=$44
2620        *=  **$0100 ; *=$4400
2630        .ENDM
2640 ;Follow:            *=$4400
2650 ;
2660 ;-----------------------------
2670        *=    STARTOFCODE
2680        CLD
2690        SEI
2700        LDX #$FC
2710        TXS
2720        JSR ALTINT  ;Finish init.
2730         LDW   TLIST,SDLSTL
2740         LDW   DBLANK,VVBLKD
2750        CLI
2760 ;
2770 ; Since this demonstrations
       action is controlled by both
2780 ; Vertical Blank and a DLI loop
       no action is needed by the
2790 ; calling program.
2800 ;
2810 IDLE
2820        JMP IDLE
2830 ;
2840 ;-----------------------------
2850 ; This is where the player
       coloring takes place.
2860 ;
2870 NMIVEC
2880        PHA            ;Pack .A and .X
2890        TXA
2900        PHA
2910        LDX #OFFSET ;Scan line start
2920 KERNAL
2930        STA WSYNC   ;Wait off-screen
2940        INX         ;next scan line.
2950        CPX #OFFSET+150 ;End-o-loop?
2960        BCS DLIDONE ;Branch if yes.
2970 ;
2980 ; Otherwise...
2990        LDA P0COLR,X ;Zero's color
3000        STA COLPM0  ;Stuff color
3010        LDA P1COLR,X ;And so forth.
3020        STA COLPM1
3030        LDA P2COLR,X
3040        STA COLPM2
3050        LDA P3COLR,X
3060        STA COLPM3
3070        JMP KERNAL  ;Stay in loop.
3080 ;
3090 DLIDONE
3100        PLA
3110        TAX
3120        PLA
3130        RTI
3140 ;
3150 ;-----------------------------
3160 DRAWTHEM
3170        LDX #ACTIVE-1
3180 PAGAIN
3190        STX CURRPLR
3200        LDA SPEED,X
3210        BPL PAGT1
3220 ;
3230        LDA MEMSPEED,X
3240        STA SPEED,X
3250 PAGT1
3260        DEC SPEED,X
3270        LDA SPEED,X
3280        BPL PAGX
3290 ;
3300        LDA PDIRECTION,X ;Moving L/R
3310        AND #$40    ;Move left bit.
3320        BNE PAG1    ;If moving left.
3330 ;
3340        LDA CURRPLR ;Moving right,
3350        JSR MOVERIGHT ;Player right.
3360        JMP PAG2    ;Jump Up or Down
3370 PAG1
3380        LDA CURRPLR ;Moving left,
3390        JSR MOVELEFT ;Player left.
3400 PAG2
3410        LDX CURRPLR ;Player number.
3420        LDA PDIRECTION,X ;Moving U/D
3430        BMI PAG3    ;if moving up.
3440 ;
3450        LDA CURRPLR ;Moving down,
3460        JSR MOVEDOWN ;Player down.
3470        JMP PAGX    ;Check next plr.
3480 PAG3
3490        LDA CURRPLR ;Player number
3500        JSR MOVEUP  ;Player Up.
3510 PAGX
3520        LDX CURRPLR ;Unpack player
3530        DEX         ;Count player.
3540        BPL  PAGAIN ;Branch if more.
3550 ;
3560        RTS
3570 ;
3580 ;-----------------------------
3590 ;This is the Vertical Blank.
3600 DBLANK
3610         LDW   NMIVEC,VDSLST
3620        JSR DRAWTHEM ;New position.
3630 ;
3640        LDX #ACTIVE-1
3650 PAGG1
3660        LDA HPOSITION,X ;Shadow pos
3670        STA HPOSP0,X ;into hardware.
3680        TXA
3690        PHA
3700        JSR DODRAW
3710        PLA
3720        TAX
3730        DEX              ;count player...
3740        BPL PAGG1        ;..until finish.
3750 XITINT
3760        PLA              ;Stock return.
3770        TAY
3780        PLA
3790        TAX
3800        PLA
3810        RTI
3820 ;
3830 ;-----------------------------
3840 ALTINT
3850        LDA #$C0
3860        STA IRQEN
3870        STA POKMSK
3880        STA NMIEN
3890        LDA #$11      ;Gang, priority.
3900        STA GPRIOR
3910        LDA # >PBASE ;Point/players.
3920        STA PMBASE
3930        LDA #3        ;Enable players.
3940        STA GRACTL
3950        LDA #$3E      ;Reg playfield.
3960        STA SDMCTL
3970        LDA #3        ;Enable keyboard
3980        STA SKCTL
3990 ;
4000        LDX #0
4010 CCAGAIN
4020        LDA #0
4030        STA P0COLR,X ;Erase colors.
```

```
4040      STA P1COLR,X
4050      STA P2COLR,X
4060      STA P3COLR,X
4070      LDA #0
4080      STA P0RAM,X ;Erase players.
4090      STA P1RAM,X
4100      STA P2RAM,X
4110      STA P3RAM,X
4120      INX
4130      BNE CCAGAIN
4140 ;
4150      LDX #14
4160 PAGAIN1
4170      LDA PLRGRAF0,X ;Draw player.
4180      STA P0RAM+VP0,X
4190      LDA PLRGRAF1,X
4200      STA P1RAM+VP1,X
4210      LDA PLRGRAF2,X
4220      STA P2RAM+VP2,X
4230      LDA PLRGRAF3,X
4240      STA P3RAM+VP3,X
4250 ;
4260      LDA P0COLG,X ;Draw colors.
4270      STA P0COLR+VP0-4,X
4280      STA P1COLR+VP1-4,X
4290      STA P2COLR+VP2-4,X
4300      STA P3COLR+VP3-4,X
4310 ;
4320      DEX
4330      BPL PAGAIN1
4340 ;
4350      RTS
4360 ;
4370 ;-----------------------------
4380        NEWPAGE
4390 P0COLG
4400      .BYTE 0,P1C+4,P1C+6,P1C+8
4410      .BYTE P1C+10,P1C+0,P1C+2
4420      .BYTE P1C+4,$18,$16
4430      .BYTE $32,$38,$34,$52,0
4440 ;
4450 P1COLG
4460      .BYTE 0,$2C,$2A,$28
4470      .BYTE $26,$24,$22,$20,$18
4480      .BYTE $1A,$52,$54,$56,$58,0
4490 ;
4500 P2COLG
4510      .BYTE 0,P3C+2,P3C+4,P3C+6
4520      .BYTE P3C+8,P3C+10,P3C+12
4530      .BYTE P3C+14,P3C+64+12
4540      .BYTE P3C+64+10,P3C+32+8
4550      .BYTE P3C+32+6,P3C+16+4
4560      .BYTE P3C+16+2,0
4570 ;
4580 P3COLG
4590      .BYTE 0,P0C+2,P0C+4,P0C+6
4600      .BYTE P0C+8,P0C+10,$20
4610      .BYTE $C4,$24,$20
4620      .BYTE P0C+10,P0C+8
4630      .BYTE P0C+6,P0C+4,P0C+2,0
4640      .BYTE 0,0,0,0,0,0,0
4650 ;
4660 ;-----------------------------
4670 DODRAW
4680      STA THISPLAYER
4690      ASL A
4700      TAX
4710 ;
4720 ; Set POINTER to point at the
       current player shape.
4730      LDA PLAYERTABLE,X
4740      STA POINTER
4750      LDA PLAYERTABLE+1,X
4760      STA POINTER+1
4770 ;
4780 ; Set POINTER+2 to point at the
       current player color strip.
4790      LDA CPLAYERTABLE,X
4800      STA POINTER+2
4810      LDA CPLAYERTABLE+1,X
4820      STA POINTER+3
4830 ;
4840 ; The following example of self-
       modifying code should never
4850 ; be used whenever there is the
       slightest chance the code will
4860 ; wind up in ROM. I use it here
       because this is only a
4870 ; demonstration program.
4880 ; We pick up the source of each
       players colors in turn and
4890 ; physically modify the address
       at Label RAMPOINTER.
4900 ;
4910      LDA SPLAYERTABLE,X
4920      STA RAMPOINTER+1
4930      LDA SPLAYERTABLE+1,X
4940      STA RAMPOINTER+2
4950 ;
4960      LDA GPLAYERTABLE,X
4970      STA GRAMPOINTER+1
4980      LDA GPLAYERTABLE+1,X
4990      STA GRAMPOINTER+2
5000 ;
5010 ; Then get this players current
       vertical position into .Y
5020      LDX THISPLAYER
5030      LDA VPOSITION,X
5040      TAY
5050 ; Now redraw the picture.
5060      LDX #0
5070 GRAMPOINTER
5080      LDA PLRGRAF0,X
5090      STA (POINTER),Y
5100      TYA
5110      SEC
5120      SBC #4
5130      TAY
5140 ; Getting the colors through the
       self-modified pointer.
5150 RAMPOINTER
5160      LDA P0COLG,X
5170      STA (POINTER+2),Y
5180      CLC
5190      TYA
5200      ADC #5
5210      TAY
5220      INX
5230      CPX #20
5240      BCC GRAMPOINTER
5250 ;
5260      RTS
5270 ;
5280 ;-----------------------------
5290 ; The next four routines are all
       identical in operation.
5300 ; Enter with desired player in
       the accumulator. Try to move
5310 ; in the desired direction. If
       not a good move, return to
5320 ; original position and toggle
       the direction flag.
5330 MOVEUP
5340      TAX
5350      SEC
5360      LDA VPOSITION,X
5370      SBC VSTEP,X
5380      STA VPOSITION,X
5390      CMP #YMIN+1
5400      BCS MUX
5410 ;
5420      CLC
5430      ADC VSTEP,X
5440      STA VPOSITION,X
5450 MU1A
5460      LDA RANDOM
5470      AND #3
5480      BEQ MU1A
5490 ;
5500      STA VSTEP,X
5510      LDA PDIRECTION,X
5520      EOR #$80
5530      STA PDIRECTION,X
5540 MUX
5550      RTS
5560 ;
5570 ;-----------------------------
5580 MOVEDOWN
5590      TAX
5600      CLC
5610      LDA VPOSITION,X
5620      ADC VSTEP,X
5630      STA VPOSITION,X
5640      CMP #YMAX-1
5650      BCC MDX
5660 ;
5670      SEC
5680      SBC VSTEP,X
5690      STA VPOSITION,X
5700 MD1A
5710      LDA RANDOM
5720      AND #3
```

continued on next page

```
5730       BEQ MD1A
5740 ;
5750       STA VSTEP,X
5760       LDA PDIRECTION,X
5770       EOR #$80
5780       STA PDIRECTION,X
5790 MDX
5800       RTS
5810 ;
5820 ;-----------------------------
5830 MOVELEFT
5840       TAX
5850       SEC
5860       LDA HPOSITION,X
5870       SBC HSTEP,X
5880       STA HPOSITION,X
5890       CMP #XMIN+1
5900       BCS GOLX
5910 ;
5920       CLC
5930       ADC HSTEP,X
5940       STA HPOSITION,X
5950 GOL1A
5960       LDA RANDOM
5970       AND #3
5980       BEQ GOL1A
5990 ;
6000       STA HSTEP,X
6010       LDA PDIRECTION,X
6020       EOR #$40
6030       STA PDIRECTION,X
6040 GOLX
6050       RTS
6060 ;
6070 ;-----------------------------
6080 MOVERIGHT
6090       TAX
6100       CLC
6110       LDA HPOSITION,X
6120       ADC HSTEP,X
6130       STA HPOSITION,X
6140       CMP #XMAX-1
6150       BCC GORX
6160 ;
6170       SEC
6180       SBC HSTEP,X
6190       STA HPOSITION,X
6200 GOR1A
6210       LDA RANDOM
6220       AND #3
6230       BEQ GOR1A
6240 ;
6250       STA HSTEP,X
6260       LDA PDIRECTION,X
6270       EOR #$40
6280       STA PDIRECTION,X
6290 GORX
6300       RTS
6310 ;
6320 ;-----------------------------
6330       .BYTE "(c) 1985, "
6340       .BYTE "ANTIC PUBLISHING"
6350 ENDCODE
6360       *=  $02E0
6370       .WORD STARTOFCODE
6380       .OPT NO LIST
6390       .END
```

enhanced disk density plus 128K

DOS 2.5

Article on page 48

LISTING 1

Don't type the TYPO II Codes!

```
RT 10 REM RAMDISK.COM FILE CREATOR
QB 20 REM BY PATRICK DELL'ERA
FW 30 REM (c) 1985, ANTIC PUBLISHING
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
XE 70 FN$="D:RAMDISK.COM":REM THIS IS THE
    NAME OF THE DISK FILE TO BE CREATED.
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
JM 1000 DATA 617
AS 1010 DATA 2552550000560920581600001402
   55207200140000064140255207136140000064
   140255207173000064208015076
OF 1020 DATA 2240071682001402552070961690
   00141255207160169007133084133085141240
   0021692461600057032170057160
RD 1030 DATA 0051850940111531060111850270
   56153222018185033056153196020136016235
   169122141093016169007141142
DO 1040 DATA 0201730100070091281410100070
   32224007169003141255207173000116201002
   208003076153057032194057169
WN 1050 DATA 2351600570322070571692540322
   18057032194057169224160057162004032204
   057016003076194057169093157
TF 1060 DATA 0680030241050101331671690581
   57069003157072003157073003105000133168
   169007157066003032086228192
RG 1070 DATA 1362082161890720031331651890
   73003133166032194057160049185041058145
   167136016248169056141225057
MP 1080 DATA 1692241600571620080322040571
   65165157072003165166157073003169093157
   068003169058157069003169011
EL 1090 DATA 0322180570321940571692351600
   57162008032204057169124157068003169029
   157069003169138157072003169
RB 1100 DATA 0211570730031690110322180570
   32194057169000133169169066133170169093
   133167169058133168162087160
UD 1110 DATA 1271690011412552071771691451
   67136016249160126177167240007136177167
   009003145167160127169007141
CJ 1120 DATA 2552071771671451691360162490
   24165169105128133169165170105000133170
   202208199169003141255207169
KY 1130 DATA 1981410011161410031161690021
   41004116160011169255153010116136208250
   169127141010116169003141132
BK 1140 DATA 1161411481161690001411291161
```

```
   41145116169056141063021169000141255207
   141240002169091160058141068
LC 1150 DATA 0031400690031620001691281570
   72003157073003169009157066003076086228
   169012162016157066003076086
MA 1160 DATA 2281420900031620161570680031
   52157069003169003157066003076086228068
   049058068085080046083089083
BZ 1170 DATA 1550680560580770690770460830
   65086155065120108111110032049050056075
   032082097109032068105115107
SI 1180 DATA 0320800971160991040290291271
   27127032032032032098121032080046076046
   032068101108108039069114097
AI 1190 DATA 1551601932482362392381602102
   25237228233243235160208225244227232160
   226249160208174204174160196
LP 1200 DATA 2292362361671972422251600680
   79083032050046053032040099041039125155
   224002225002000056
```

clean, handy XL/XE BASIC control

BASIC ON/OFF SWITCHER

Article on page 43

LISTING 1

Don't type the TYPO II Codes!

```
PF 2 REM GO.BAS
AI 4 REM BY IAN CHADWICK
FG 6 REM (c) 1985, ANTIC PUBLISHING
ZC 10 ? "↖"
QF 20 X=1535
JF 30 FOR N=1 TO 18:READ A
QO 40 POKE X+N,A:PRINT X+N:NEXT N
FR 100 DATA 169,0
AV 110 DATA 141,248,3
MZ 120 DATA 169,82
YO 130 DATA 141,235,3
RA 140 DATA 169,253
TS 150 DATA 141,211,1
PY 160 DATA 76,116,228
GG 199 REM ASSEMBLY CODE:
DQ 200 REM LDA $#0
OH 210 REM STA $03F8 ;BASIC RAM FLAG
LL 220 REM LDA $#52
BP 230 REM STA $03EB ;CARTRIDGE CHECKSUM
GM 240 REM LDA $#FD
VU 250 REM STA $D301 ;BASIC ROM FLAG
AQ 260 REM JMP $E474 ;XL/XE WARMSTART
JP 300 ? "GO TO DOS AND USE OPTION K"
HA 310 ? "TO BINARY SAVE THIS AS A FILE"
JD 320 ? "ENTER AS: GO,600,612,,600"
```

speedy, convenient DUP.SYS loading

INSTANT-DOS

Article on page 46

LISTING 1

Don't type the TYPO II Codes!

```
UD 10 REM INSTANT DOS
AX 20 REM BY SCOTT FICK
FW 30 REM (c) 1985, ANTIC PUBLISHING
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
NP 70 FN$="D:MODIFY.OBJ":REM THIS IS THE
   NAME OF THE DISK FILE TO BE CREATED.
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")     "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "◘TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "◘TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
GS 1000 DATA 314
OC 1010 DATA 2552551220211240210761920230
   70023137023032085024169000133212133214
   169029133215169192133213162
AS 1020 DATA 0160321190241692161332131620
   07032119024032070024096169000133212169
   224133213160000162003177212
NN 1030 DATA 0720320850241041452120320700
   24200208241230213202016236096182023251
   023240073032070023206158023
VE 1040 DATA 0480650321460250321050231692
   55141158021141157021162016169047157068
   003169024157069003032164021
GM 1050 DATA 0320850241620211690001332121
   33214169031133215169228133213032119024
   032070024169000141157021096
SO 1060 DATA 0190240390240320850241690001
   33214133212169228133215169031133213162
   021208018058024135024032119
PL 1070 DATA 0240320700242061570210761170
   32032102024088169112141014212165016141
   014210096120169000141014212
EL 1080 DATA 1410142101730012110412540761
```

continued on next page

```
   070241730012110090011410012110962342342
   34234032156025096160000177
CI 1090 DATA 2141452122002082492302132302
   15202208242096063025097025032085024169
   000133212133214169029133213
DK 1100 DATA 1691921332151620160321190241
   69216133215162007032119024032070024096
   054031062031201173196207211
LV 1110 DATA 032040099041
```

game of the month

WARRIOR 3000

Article on page 40

LISTING 1

```
JH 5 REM WARRIOR 3000
KI 6 REM BY KEN GREINER
FH 7 REM (c) 1985, ANTIC PUBLISHING
MT 10 POKE 106,PEEK(740)-5:GRAPHICS 0:POK
   E 752,1:SETCOLOR 2,0,0:GOSUB 1000:GOTO
    430
HJ 20 J0=15-STICK(0):C0(0)=C0(J0):P0=PP0+
   M(J0):IF J0=0 THEN 50
BN 30 IF PEEK(P0)<>0 THEN GOSUB 200
KR 40 POKE PP0,0:POKE P0,C0(0):PP0=P0
HD 50 IF STRIG(0)=0 THEN GOSUB 100
AI 60 J1=15-STICK(1):C1(0)=C1(J1):P1=PP1+
   M(J1):IF J1=0 THEN 90
ID 70 IF PEEK(P1)<>0 THEN GOSUB 250
PM 80 POKE PP1,0:POKE P1,C1(0):PP1=P1
IY 90 IF STRIG(1)=0 THEN GOSUB 110
SR 99 GOTO 20
RQ 100 IF E0<1 THEN RETURN
HK 105 E0=E0-1:POSITION 4,0:? E0;" ":D=CH
   (C0(0)-96):MI=C0(0)+8:MS=P0+D:SH=2
WM 106 IF PEEK(MS)<>0 THEN GOSUB 500:E0=E
   0+1:POSITION 4,0:? E0:RETURN
NI 107 GOTO 130
SB 110 IF E1<1 THEN RETURN
IV 115 E1=E1-1:POSITION 34,0:? E1;" ":D=C
   H(C1(0)-96):MI=C1(0)+8:MS=P1+D:SH=1
JT 120 IF PEEK(MS)<>0 THEN GOSUB 500:E1=E
   1+1:POSITION 34,0:? E1:RETURN
RY 130 FOR A=25 TO 40:MM=MS+D:IF PEEK(MM)
   <>0 THEN 150
SE 140 SOUND 0,A,12,10:POKE MS,0:POKE MM,
   MI:MS=MM:NEXT A:SOUND 0,0,0,0:POKE MM,
   0
XZ 150 GOSUB 300:GOSUB 500:RETURN
GZ 200 P=PEEK(P0)
LD 201 IF P=32 THEN 210
HG 202 IF P=6 OR P=118 THEN 220
HE 203 IF P=119 THEN SOUND 0,100,10,12:FO
   R I=1 TO 5:NEXT I:SOUND 0,0,0,0
HK 209 P0=PP0:RETURN
EK 210 E0=E0+1:FOR I=30 TO 0 STEP -1:SOUN
   D 0,I,10,10:NEXT I:POSITION 4,0:? E0:R
   ETURN
IS 220 NE=INT(RND(0)*839)+120+SC:IF PEEK(
   NE)<>0 THEN 220
VF 230 POKE PP0,0:P0=NE:PP0=NE:GOSUB 290:
   RETURN
HW 250 P=PEEK(P1)
PE 251 IF P=32 THEN 260
MV 252 IF P=6 OR P=118 THEN 270
MY 253 IF P=119 THEN SOUND 0,150,10,12:FO
   R I=1 TO 5:NEXT I:SOUND 0,0,0,0
IK 259 P1=PP1:RETURN
UH 260 E1=E1+1:FOR I=30 TO 0 STEP -1:SOUN
   D 0,I,10,10:NEXT I:POSITION 34,0:? E1:
   RETURN
TC 270 NE=INT(RND(0)*839)+120+SC:IF PEEK(
   NE)<>0 THEN 270
HU 280 POKE PP1,0:P1=NE:PP1=NE
OQ 290 FOR I=27 TO 31:POKE NE,I:FOR J=1 T
   O 20 STEP 2:SOUND 0,J+30,10,10:NEXT J:
   NEXT I:SOUND 0,0,0,0:RETURN
DC 300 P=PEEK(MM):POKE MS,0
UP 310 IF P=1 THEN SOUND 0,0,0,0:RETURN
VU 311 IF P=119 THEN POKE MM,1:FOR I=100
   TO 50 STEP -2:SOUND 0,I,10,8:NEXT I:SO
   UND 0,0,0,0:RETURN
CL 320 IF P<97 AND P>104 THEN 330
RH 325 IF MM=P0 OR MM=P1 THEN FOR I=0 TO
   120 STEP 4:POKE MM,113+I/30:SOUND 0,I,
   8,15:SOUND 1,I,10,10:NEXT I:GOTO 400
JM 330 FOR I=0 TO 3 STEP 0.15:POKE MM,2+I
   :SOUND 0,I*50,12,I+12:NEXT I:POKE MM,0
   :SOUND 0,0,0,0:RETURN
VU 400 SOUND 1,0,0,0:FOR J=0 TO 3:FOR I=5
   0 TO 0 STEP -1:SOUND J,I,10,10:NEXT I:
   NEXT J
LN 410 ROUND=ROUND+1:MEN(SH)=MEN(SH)-1:IF
    MEN(SH)<>0 THEN 1050
CJ 420 POSITION 16,12:? "GAME OVER":FOR I
   =1 TO 1000:NEXT I
UY 430 GRAPHICS 1+16:FOR I=1 TO 10 STEP 0
   .5:POSITION 4,I
CT 435 ? #6;"warrior":SOUND 0,I*5,8,15:PO
   SITION 12,20-I:? #6;"✚⊠⊠⊠"
UE 440 SOUND 1,I*5,12,10:POSITION 4,I-1:?
    #6;"       ":POSITION 12,20-(I-1):? #
   6;"    ":NEXT I
CE 445 FOR I=1 TO 12:POSITION 3+I,10:? #6
   ;TI$(I,I);:SOUND 0,10,10,10:FOR D=1 TO
    15:NEXT D:SOUND 0,0,0,0
VB 446 SOUND 1,0,0,0:NEXT I
WC 450 IF STRIG(0)=0 AND STRIG(1)=0 THEN
   460
AO 455 IF PEEK(53279)<>6 THEN 450
QQ 460 GRAPHICS 0:GOTO 1040
CD 500 IF E0>0 OR E1>0 THEN RETURN
RG 510 M=INT(RND(0)*839)+120+SC:IF PEEK(M
   )<>0 THEN 510
DU 520 FOR I=28 TO 32:SOUND 0,100-I*2,6,1
   0:POKE M,I:FOR D=1 TO 20:NEXT D:NEXT I
   :SOUND 0,0,0,0:RETURN
PR 999 END
HJ 1000 POSITION 16,11:? "STAND BY":RESTO
   RE 1030
MI 1010 DIM M(15),C0(15),C1(15),CH(15),ME
   N(2),TI$(12)
AT 1015 TI$="WARRIOR 3000"
AM 1020 FOR I=0 TO 10:READ M,C0,CH:M(I)=M
   :C0(I)=C0:C1(I)=C0:CH(I)=CH:NEXT I
OO 1030 DATA 0,100,0,-40,99,1,40,100,-1,0
   ,0,-40,-1,98,40,-41,103,-39,39,102,39,
   0,0,-41,1,97,41,-39,101,0,41,104,0
BU 1035 GOSUB 10000:RETURN
JT 1040 SC=PEEK(88)+256*PEEK(89):MEN(1)=5
   :MEN(2)=5:ROUND=1:POKE 752,1:POKE 756,
   CHSET/256
EJ 1050 ? "↖":SETCOLOR 2,0,0:E0=20:E1=20:
   POSITION 4,0:? E0:POSITION 34,0:? E1:P
   OSITION 17,1:? "ROUND ";ROUND
OP 1053 FOR I=0 TO MEN(1)-1:POSITION 4+I,
   2:? "d";:NEXT I:? " ";:FOR I=0 TO MEN(
   2)-1:POSITION 31+I,2:? "d";:NEXT I
HL 1054 ? " ";:POKE 77,0
PR 1055 COLOR 33:PLOT 38,23:DRAWTO 0,23:D
   RAWTO 0,3:DRAWTO 39,3:DRAWTO 39,22:POK
   E SC+959,1
XS 1060 SOUND 3,0,0,0:RESTORE 2000+((ROUN
   D-1)*10):COLOR 33
KQ 1070 READ PP0,PP1:PP0=PP0+SC:PP1=PP1+S
   C
YI 1080 READ C0,A,B,C,D:IF A<>-1 THEN COL
   OR C0:PLOT A,B:DRAWTO C,D:GOTO 1080
```

```
MM 1090 READ A,B:IF A<>-1 THEN POKE SC+A,
   B:GOTO 1090
JY 1100 FOR I=1 TO 5:FOR J=0 TO 20:SOUND
   0,J,12,10:NEXT J:NEXT I:SOUND 0,0,0,0
TF 1999 TRAP 20:COLOR 32:PLOT 0,0:RETURN
WN 2000 DATA 161,918,33,20,7,20,19,33,15,
   13,25,13,33,8,9,11,9,33,8,17,11,17,33
IL 2001 DATA 29,9,32,9,33,29,17,32,17,161
   ,9,12,9,14
DZ 2002 DATA 161,31,12,31,14,0,-1,0,0,0
MW 2009 DATA 198,6,881,6,253,84,267,84,82
   7,84,813,84,161,104,918,103,-1,0
MP 2010 DATA 198,881,33,19,6,19,20,33,21,
   6,21,20,33,15,9,15,17,33,25,9,25,17,6,
   7,10,10,13,6,30,14,33,17
UL 2011 DATA 7,10,14,7,17,7,33,10,30,13,0
   ,-1,0,0,0
TA 2019 DATA 539,124,541,124,411,84,429,8
   4,691,84,709,84,161,6,918,6,198,102,88
   1,101,-1,0
PC 2020 DATA 161,918,33,17,5,22,5,33,17,2
   1,22,21,33,3,10,3,16,33,7,10,7,16,33,3
   2,10,32,16,33,36,10,36,16
DS 2021 DATA 18,10,10,12,10,18,27,10,29,1
   0,18,10,16,12,16,18,27,16,29,16,18,13,
   7,16,7,18,23,7,25,7,18,13,19,16,19
DO 2022 DATA 18,23,19,25,19,0,-1,0,0,0
KB 2023 DATA 293,81,306,69,773,90,786,67,
   333,124,373,124,413,67,346,124,386,124
   ,426,90,706,124,746,124,693,124
PE 2024 DATA 733,124,653,69,666,81,444,84
   ,446,84,524,84,526,84,604,84,606,84,47
   3,84,475,84,553,84,555,84,635,84
CQ 2025 DATA 633,84,360,0,359,0,720,0,719
   ,0,539,6,540,6,321,1,401,1,318,1,398,1
   ,678,1,758,1,681,1,761,1
YR 2029 DATA 198,6,881,6,161,104,918,103,
   -1,0
HO 2030 DATA 198,881,33,14,4,14,11,33,14,
   11,26,11,33,26,11,26,4,33,14,22,14,15,
   33,14,15,26,15,33,26,15,26,22
SD 2031 DATA 161,5,7,11,7,161,29,7,35,7,1
   61,5,19,11,19,161,29,19,35,19,148,3,11
   ,3,15,148,37,11,37,15,0,-1,0,0,0
HL 2035 DATA 300,6,340,6,740,6,780,6,496,
   84,498,84,500,84,502,84,504,84,576,84,
   578,84,580,84,582,84,584,84
TH 2036 DATA 334,124,746,124,552,119,528,
   119,198,102,881,101,-1,0
AN 2040 DATA 198,881,33,23,6,31,6,33,31,7
   ,34,7,33,34,7,34,11,33,34,11,26,11,33,
   26,11,26,8,33,23,8,29,8
OR 2041 DATA 33,29,9,32,9,119,18,11,21,11
   ,119,21,11,21,14,119,21,14,18,14,119,1
   8,14,18,11,33,5,15,13,15
WH 2042 DATA 33,13,15,13,18,33,10,18,16,1
   8,33,10,17,7,17,33,5,15,5,19,33,5,19,8
   ,19,33,8,20,16,20
EJ 2043 DATA 20,6,11,6,5,20,6,5,12,11,20,
   12,11,12,5,20,33,21,33,15,20,33,15,27,
   21,20,27,21,27,15
UE 2044 DATA 38,27,9,28,9,38,27,10,28,10,
   38,19,12,20,12,38,19,13,20,13,38,11,16
   ,12,16,38,11,17,12,17
KJ 2045 DATA 32,0,13,0,14,148,18,18,18,20
   ,148,21,6,21,8
TO 2046 DATA 0,-1,0,0,0,519,0,559,0,481,1
   ,601,1,478,1,598,1,773,66,776,66,303,8
   6,306,86,198,102,881,101,-1,0
UY 2050 DATA 187,890,33,26,4,26,7,33,28,4
   ,28,7,33,9,19,9,22,33,11,19,11,22,33,2
   5,11,25,14,33,27,11,27,14
FI 2051 DATA 33,25,16,25,19,33,27,16,27,1
   9,33,22,14,24,14,33,28,14,30,14,33,22,
   16,24,16,33,28,16,30,16
CK 2052 DATA 33,8,8,8,11,33,18,8,18,11,33
   ,8,8,9,8,33,17,8,18,8,33,10,6,10,8,33,
   12,6,12,7,33,14,6,14,7
KB 2053 DATA 33,16,6,16,8,33,12,7,13,7,33
   ,10,10,10,12,33,16,10,16,12,33,12,12,1
   2,14,33,14,12,14,14,33,10,14,11,14
CM 2054 DATA 33,14,14,16,14,20,17,16,17,1
   8,20,19,16,19,18,20,22,8,23,8,161,36,6
   ,36,7,161,31,10,31,11,161,4,16,4,17
QT 2055 DATA 22,22,15,25,15,2,27,15,30,15
   ,13,26,11,26,14,14,26,16,26,19,0,-1,0,
   0,0
NY 2056 DATA 533,6,626,6,291,77,295,77,44
   9,78,457,78,573,78,417,77,530,86,409,7
   7,241,1,280,0,279,0
PH 2057 DATA 320,0,361,1,319,0,358,1,238,
   1,536,66,640,0,680,0,639,0,679,0,601,1
AL 2058 DATA 721,1,598,1,718,1,187,100,89
   0,99,-1,0
EE 2060 DATA 161,918,33,2,7,6,7,33,6,9,4,
   9,33,4,9,4,11,33,2,11,2,7,33,35,16,35,
   18,33,33,18,35,18,33,37,16,37,20
BP 2061 DATA 33,33,20,37,20,6,8,7,11,10,6
   ,12,17,15,20,6,24,7,27,10,6,28,17,31,2
   0,7,15,7,12,10,7,11,17,8,20
TV 2063 DATA 7,31,7,28,10,7,27,17,24,20,1
   19,15,9,24,18,119,24,9,15,18,0,-1,0,0,
   0
RK 2064 DATA 323,6,796,6,325,66,326,66,40
   3,78,676,77,716,77,443,78,793,86,794,8
   6,560,0,521,1,601,1,559,0,598,1
HK 2065 DATA 566,118,553,118,518,1,161,10
   4,918,103,-1,0
BR 2070 DATA 198,881,33,6,6,10,6,33,6,6,6
   ,9,33,8,6,8,9,33,10,6,10,9,33,29,6,33,
   6,33,29,6,29,9,33,31,6,31,9
SJ 2071 DATA 33,33,6,33,9,33,6,20,10,20,3
   3,6,20,6,17,33,8,20,8,17,33,10,20,10,1
   7
QZ 2072 DATA 33,29,20,33,20,33,29,20,29,1
   7,33,31,20,31,17,33,33,20,33,17,0,-1,0
   ,0,0
AT 2073 DATA 216,98,223,97,258,102,261,10
   4,281,1,320,0,361,1,278,1,319,0,358,1,
   446,103,448,99,450,101,469,103
FL 2074 DATA 471,99,473,101,418,98,421,97
   ,526,98,528,129,530,97,549,98,551,129,
   553,97,496,98,498,103,501,101,503,97
YR 2075 DATA 606,102,608,100,610,104,629,
   102,631,100,633,104,576,98,578,102,581
   ,104,583,97,658,100,661,100
YF 2076 DATA 818,98,821,97,856,98,863,97,
   287,118,289,118,310,118,312,118,767,11
   8,769,118,790,118,792,118
VL 2077 DATA 721,1,718,1,801,1,798,1,759,
   0,760,0,198,102,881,101,-1,0
BV 2080 DATA 536,543,32,0,5,0,22,32,39,4,
   39,21,20,5,13,14,13,20,25,13,34,13,119
   ,19,4,19,22,119,20,4,20,22
CP 2081 DATA 20,14,13,10,9,20,14,13,10,17
   ,20,25,13,29,9,20,25,13,29,17,33,0,23,
   39,23,20,5,7,1,7,20,5,7,3,5
JC 2082 DATA 20,5,7,3,9,20,34,7,38,7,20,3
   4,7,36,5,20,34,7,36,9,20,5,19,1,19,20,
   5,19,3,17,20,5,19,3,21
QJ 2083 DATA 20,34,19,38,19,20,34,19,36,1
   7,20,34,19,36,21,20,14,7,18,7,20,18,7,
   16,5,20,18,7,16,9
UA 2084 DATA 20,21,7,25,7,20,21,7,23,5,20
   ,21,7,23,9,20,14,19,18,19,20,18,19,16,
   17,20,18,19,16,21
LV 2085 DATA 20,21,19,25,19,20,21,19,23,1
   7,20,21,19,23,21
QZ 2086 DATA 0,-1,0,0,0,286,118,313,118,7
   66,118,793,118,536,97,543,98,-1,0
NS 10000 RESTORE 10000:CHSET=(PEEK(106)+1
   )*256:FOR I=0 TO 1023:POKE CHSET+I,PEE
   K(57344+I):NEXT I
OA 10010 READ A:IF A<0 THEN RETURN
BN 10020 FOR I=0 TO 7:READ B:POKE CHSET+A
   *8+I,B:NEXT I:GOTO 10010
WX 10030 DATA 1,255,170,170,170,170,170,1
   70,255
UM 10040 DATA 2,24,0,22,196,91,16,68,48
XS 10050 DATA 3,16,2,52,64,66,26,3,32
GC 10060 DATA 4,0,8,4,104,2,20,34,0
FG 10070 DATA 5,0,0,16,36,36,8,0,0
PG 10080 DATA 6,0,24,102,153,102,153,102,
   24
DI 10090 DATA 27,0,0,40,20,40,20,0,0
EI 10100 DATA 28,0,40,40,68,68,40,40,0
VK 10110 DATA 29,24,0,36,129,129,36,0,24
CU 10120 DATA 30,36,36,129,145,137,129,36
   ,36
YD 10130 DATA 31,165,66,129,0,0,129,66,16
   5
UC 10140 DATA 32,16,145,16,165,165,16,145
   ,16
CO 10150 DATA 97,48,52,34,122,114,52,104,
   204
NK 10160 DATA 98,24,88,136,188,156,88,44,
   102
HL 10170 DATA 99,2,25,25,127,25,26,36,36
BV 10180 DATA 100,32,76,76,123,76,44,18,1
   8
```

continued on next page

```
HF 10190 DATA 101,20,50,49,109,113,48,88,
76
VX 10200 DATA 102,24,24,136,156,186,68,44
,102
SM 10210 DATA 103,20,38,70,91,71,6,13,25
WD 10220 DATA 104,48,48,34,114,186,68,104
,204
OO 10230 DATA 105,0,0,0,170,0,0,0,0
QE 10240 DATA 106,0,0,0,0,170,0,0,0
CL 10250 DATA 107,8,8,8,8,8,8,8,8
DD 10260 DATA 108,8,8,8,8,8,8,8,8
GG 10270 DATA 109,5,2,5,8,16,32,64,0
VT 10280 DATA 110,0,2,4,8,16,160,64,160
AD 10290 DATA 111,160,64,16,16,8,4,2,0
CK 10300 DATA 112,0,64,32,16,8,5,2,5
PM 10310 DATA 113,40,68,146,36,36,74,40,4
0
ZL 10320 DATA 114,65,136,44,5,104,160,11,
34
TK 10330 DATA 115,9,192,20,34,8,32,33,129
SE 10340 DATA 116,0,16,6,32,4,80,0,0
SH 10350 DATA 117,0,8,0,16,42,0,16,0
ZD 10360 DATA 118,0,0,0,0,0,0,0,0
ZV 10370 DATA 119,0,0,0,0,0,0,0,0
AF 10380 DATA 71,128,32,32,8,8,2,2,0
IA 10390 DATA 70,0,2,2,8,8,32,32,128
QX 10400 DATA 84,0,20,85,85,85,85,20,0
EX 10500 DATA -1
```

st section

FORTH ESCAPES

Article on page 54

LISTING 1

```
Block: 1

\ Escape Sequence
DECIMAL
: ESC ( S --- )    27 EMIT ;
: 1TERM                        \ Defining word for Terminal words
    CREATE                     \ Usage : 1TERM <name> ascii
       [COMPILE] ASCII C,
    DOES>                      \ ( S --- )
      ESC C@ EMIT ;







                                                  -->

Block: 2

\ Ascii Escape Sequence Words - 1
1TERM REVERSE.ON p           \ Reverse video on
1TERM REVERSE.OFF q          \ Reverse video off
1TERM HOME H                 \ Home cursor at upper left corner
\ 1TERM CLEAR E              \ Clear video and home cursor
1TERM UP A                   \ Cursor up
1TERM DOWN B                 \ Cursor down
1TERM RIGHT C                \ Cursor right
1TERM LEFT D                 \ Cursor left
1TERM SAVE.CURSOR j          \ Save cursor position
1TERM RESTORE.CURSOR k       \ Restore to saved cursor position
1TERM -INDEX I               \ Reverse index (line feed)
1TERM CLR.EOP J              \ Erase to end of page


                                                  -->

Block: 3

\ Ascii Escape Sequence Words - 2
1TERM CLR.EOL K              \ Erase to end of line
```

```
1TERM +LINE L                   \ Insert line
1TERM -LINE M                   \ Delete line
1TERM CLR.LINE 1                \ Erase current line
1TERM CLR.SOL o                 \ Erase from start of current line
1TERM WRAP v                    \ Wrap around at end of video line
1TERM NO.WRAP w                 \ Discard at end of video line
1TERM CLR.SOS d                 \ Erase from start of screen to cursor
1TERM NO.CURSOR f               \ No cursor on video
1TERM CURSOR.BACK e             \ Restore cursor back on video




                                                 -->
```

```
Block: 4

\ Misc. Escape Sequence Words
: AT ( S column row --- )         \ put cursor at <col,row>
         ESC ASCII Y EMIT 32 + EMIT  32 + EMIT ;
HEX
: FOREGROUND ( S color --- )      \ set foreground color
         ESC ASCII b EMIT 0000000F AND EMIT ;
: BACKGROUND ( S color --- )      \ set background color
         ESC ASCII c EMIT 0000000F AND EMIT ;
DECIMAL
```

TINY LIST

by JERRY WHITE

Do you make a lot of printouts while you're developing a program? Cut down on paper costs by printing listings in characters that are small . . . but surprisingly readable.

Tiny List is a short BASIC program that works on all Atari computers of any memory size, However, as written, the program requires a disk drive and either an Epson or a Gemini printer. If you come up with a way to re-configure Tiny List by changing a few lines, send it to **Antic** for possible publication.

A standard typeface prints 66 80-character lines to the page. Tiny List prints 140 lines of 132 characters each—but these mini characters come out very dark and sharp-edged so they're not really hard to read.

Type in the program, check it with TYPO II and SAVE it. Before using, LOAD and LIST your BASIC program—or any ATASCII file—to disk. Then RUN Tiny List and follow the prompts.

Tiny List gives you automatic headers and page numbers, and skips over the perforations. Inverse characters are printed the same as normal ones. But special graphics characters are just displayed as hyphens [-]. Tiny List automatically prints your listing's line count.

*Jerry White is an **Antic** Contributing Editor and the organizer of the Professional Atari Programmers Information Exchange (PAPIE).*

continued on next page

LISTING 1

Don't type the TYPO II Codes!

```
HB 10 REM TINYLIST
AU 20 REM BY JERRY WHITE
FW 30 REM (c) 1985, ANTIC PUBLISHING
TQ 100 GOSUB 350
LY 110 L$=B$:L$(LEN(L$)+1)=H$:L$(LEN(L$)+
   1)="    PAGE ":L$(LEN(L$)+1)=STR$(PAGE)

VT 115 GOSUB 470:LPRINT :TL=0
JF 120 TRAP 220:LL=0:L$=""
PY 130 GET #1,IT:IF IT=155 THEN 170
RJ 140 LL=LL+1:IF IT>127 THEN IT=IT-128
BA 150 IF IT<32 THEN IT=45
GW 160 L$(LL,LL)=CHR$(IT):GOTO 130
VI 170 LP=INT(LL/132)+1:IF LP=INT(LL/132)
    THEN LP=LP-1
WF 180 PL=PL+LP:TL=TL+LP
FU 190 GOSUB 470:IF TL<140 THEN 120
WO 200 RLINE=200:TRAP 310:PRINT #3;CHR$(1
   2)
WX 210 PAGE=PAGE+1:GOTO 110
JK 220 POKE 752,1
CT 230 L$=STR$(PL):L$(LEN(L$)+1)=" LINES
   PRINTED":LPRINT :GOSUB 470
BK 240 ? #3;CHR$(12):FOR DEVICE=1 TO 3:CL
   OSE #DEVICE:NEXT DEVICE:POKE 766,0
GH 250 TRAP 40000:POP :? :? ,"PRESS OPTIO
   N TO RERUN"
NP 260 ? :? ,"PRESS SELECT TO END":? :? ,
   "PRESS START FOR DOS"
CN 270 BUTTON=PEEK(53279):IF BUTTON=6 THE
   N DOS
OE 280 IF BUTTON=5 THEN GRAPHICS 0:? :? "
   BASIC":? "IS";:END
IF 290 IF BUTTON=3 THEN RUN
OR 300 GOTO 270
JD 310 ? CHR$(253):? :? ,"YOUR PRINTER IS
   N'T READY"
OV 320 ? :? ,"PRESS START WHEN READY":TRA
   P 40000
RI 330 IF PEEK(53279)=6 THEN GOTO RLINE
NR 340 GOTO 330
NW 350 DIM B$(7),H$(80),F$(15),L$(FRE(0)-
   256)
IS 360 PAGE=1:POKE 201,8:TRAP 310
RR 370 RLINE=370:CLOSE #2:CLOSE #3:OPEN #
   2,12,0,"E:":OPEN #3,8,0,"P:"
CO 380 DATA 27,65,5,15,27,83,0
RS 390 FOR ME=1 TO 7:READ IT:SOUND 0,100-
   IT,10,8:B$(ME,ME)=CHR$(IT):NEXT ME
GV 400 ? :? ," T I N Y L I S T ":SOUND 0,
   0,0,0
GK 410 POKE 752,0:POKE 764,255:? :? "ENTE
   R HEADING INFORMATION:":? :INPUT H$
AI 420 ? :? "ENTER INPUT FILENAME";:INPUT
    F$:TRAP 460:IF LEN(F$)<2 THEN 440
GM 430 IF F$(2,2)=":" OR F$(3,3)=":" THEN
    L$=F$:GOTO 450
UG 440 L$="D:":L$(LEN(L$)+1)=F$
VW 450 CLOSE #1:OPEN #1,4,0,L$:POKE 766,1
   :RETURN
PZ 460 ? CHR$(253):? L$;" NOT FOUND":GOTO
    420
HB 470 RLINE=470:TRAP 310:FOR DEVICE=2 TO
    3:? #DEVICE;L$:NEXT DEVICE:RETURN
```

---

tutorial with demonstration programs

MASTERING THE ATARI 1020 PLOTTER

Article on page 29

LISTING 1

Don't type the TYPO II Codes!

```
TJ 2 REM 1020 PLOTTER, LISTING 1
XX 3 REM BY KRIS CRUZ
FE 4 REM (c) 1985, ANTIC PUBLISHING
VV 5 CLOSE #2:OPEN #2,8,0,"P":? #2;"␛␛":?
    #2;"C0"
VB 10 ? #2;"X2,10,48":? #2;"M220,0":? #2;
   "X0,10,20":? #2;"M220,-200":? #2;"X0,1
   0,20"
BT 15 ? #2;"H*C1":DEG
IA 20 FOR THETA=0 TO 360:? #2;"D";THETA;"
   ,";50*SIN(THETA*4):NEXT THETA
OJ 30 ? #2;"H*C2"
AB 40 FOR THETA=0 TO 360:? #2;"D";THETA;"
   ,";50*COS(THETA*4):NEXT THETA
OY 50 ? #2;"H*C3"
UR 60 FOR THETA=0 TO 360:? #2;"D";THETA;"
   ,";5*(SIN(THETA*4)/COS(THETA*4)):NEXT
   THETA
BB 70 ? #2;"M0,-230":? #2;"A":? #2;"␛□SIN
   ,COS,TAN RELATIONSHIP"
LZ 80 CLOSE #2
YX 90 END
```

LISTING 2

```
UM 2 REM 1020 PLOTTER, LISTING 2
XX 3 REM BY KRIS CRUZ
FE 4 REM (c) 1985, ANTIC PUBLISHING
TI 10 CLOSE #2:OPEN #2,8,0,"P:":C=0:REM O
   PEN IOCB CHANNEL #2 TO PLOTTER
SW 20 DIM C(1),SD(1):DEG :REM CALCULATE A
   NGLES IN DEGREES
CH 28 ? #2;"␛␛"
TG 29 SD=150:GOSUB 30:SD=325:GOSUB 30:GOT
   O 90
ZE 30 ? #2;"M";SD+50*COS(0);",";50*SIN(0)

ZQ 40 FOR P=1 TO 130 STEP 5
SV 45 ? #2;"M";SD+(P+1)*COS(Z);",";(P+1)*
   SIN(Z):DEG
FJ 50 FOR Z=0 TO 360 STEP 5
OP 60 ? #2;"D";SD+P*COS(Z);",";P*SIN(Z)
OS 70 NEXT Z
AJ 75 RAD :? #2;"M";SD+(P+1)*COS(Z);",";(
   P+1)*SIN(Z):DEG
LH 80 NEXT P
AI 85 RETURN
PR 90 PRINT #2;"H"
LJ 100 CLOSE #2
```

LISTING 3

```
VP 2 REM 1020 PLOTTER, LISTING 3
XX 3 REM BY KRIS CRUZ
FE 4 REM (c) 1985, ANTIC PUBLISHING
NR 10 CLOSE #2:OPEN #2,8,0,"P:":C=0:R=1:R
   EM OPEN IOCB CHANNEL #2 TO PLOTTER
```

```
LT 20 DIM C(1),R(1):DEG :REM CALCULATE AN
   GLES IN DEGREES
CB 25 ? #2;"%N"
IH 30 ? #2;"M";200+1*COS(0);",";200+1*SIN
   (0)
LF 40 FOR P=0 TO 300 STEP 2:REM STEP IS #
   DEGREES TO ROTATE TRIANGLE
EK 45 ? #2;"C";C:IF C=4 THEN C=0
WF 46 C=C+1:R=R+2:? #2;"M";200+R*COS(P);"
   ,";200+R*SIN(P)
EV 50 FOR Z=P TO 360+P STEP 120
PL 60 ? #2;"D";200+R*COS(Z);",";200+R*SIN
   (Z)
OS 70 NEXT Z
LH 80 NEXT P
PR 90 PRINT #2;"H"
LJ 100 CLOSE #2
```

LISTING 4

```
HL 10 REM 1020 PLOTTER CUBE, LISTING 4
TS 20 REM BY KRIS CRUZ
FW 30 REM (c) 1985, ANTIC PUBLISHING
MN 50 CLOSE #2:OPEN #2,8,0,"P:":PRINT #2;
   "%N":REM OPEN 1020 FOR GRAPHICS MODE
VX 60 DEG :REM SET ANGLES IN DEGREES
QG 70 DIM R1(1),R2(1),P(1):R1=80:R2=80:RE
   M THESE VALUSE DETERMINE SIZE OF BOXES
    1&2
NJ 80 PRINT #2;"M";100+R1*COS(45);",";100
   +R1*SIN(45)
OC 90 FOR THETA=45 TO 405 STEP 90:REM 360
    DEGREES WITH ROTATED BOXES
AO 100 PRINT #2;"D";100+R1*COS(THETA);","
   ;100+R1*SIN(THETA)
TH 110 NEXT THETA
PB 120 PRINT #2;"M";150+R2*COS(45);",";20
   0+R2*SIN(45):REM LIFT PEN AND MOVE FOR
    NEXT BOX
PJ 130 FOR THETA=45 TO 405 STEP 90
IR 140 PRINT #2;"D";150+R2*COS(THETA);","
   ;200+R2*SIN(THETA)
TP 150 NEXT THETA
MS 160 READ P:IF P=0 THEN GOTO 500
ZV 170 PRINT #2;"M";100+R1*COS(P);",";100
   +R1*SIN(P)
CF 180 PRINT #2;"D";150+R2*COS(P);",";200
   +R2*SIN(P)
OM 190 GOTO 160
FM 500 PRINT #2;"H":REM SEND PEN TO HOME
   POSITION
LP 510 CLOSE #2
NY 520 END
CO 600 DATA 45,135,225,315,0
```

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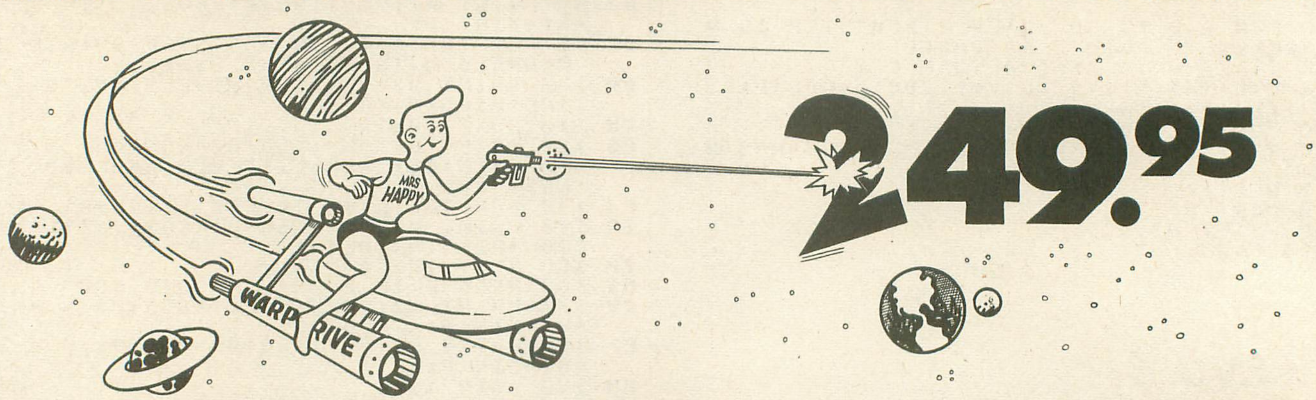

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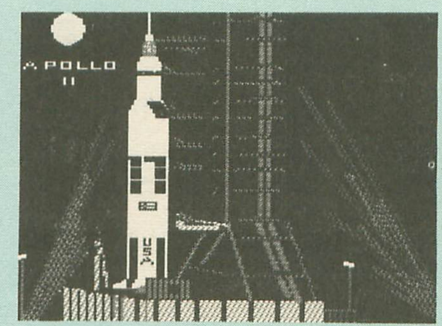

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PO Box 20212
Columbus, OH 43220
(614) 457-8600

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(wargames)
Strategic Simulations Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
48K disk

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(Software)
Royal Software
2160 W. 11th Avenue
Eugene, OR 97402
(503) 683-6620
(requires 80-column printer)
$89.95, 48K disk

Complete small-business inventory system retrieves any item within five seconds. Includes File Record, Monthly Report, Recommended Orders, Outstanding Orders, Inventory Update Forms. As many as 1,700 items on a double density disk. Supports up to four disk drives.

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(914) 332-4545
$79.95, 48K disk

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continued on next page

new products

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Indus Systems
9304 Deering Avenue
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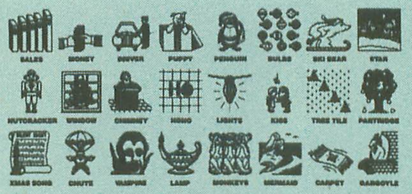

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San Rafael, CA 94903
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$24.95, 48K disk

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(game)
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17303 Glenhew Rd.
Humble, TX 77396
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